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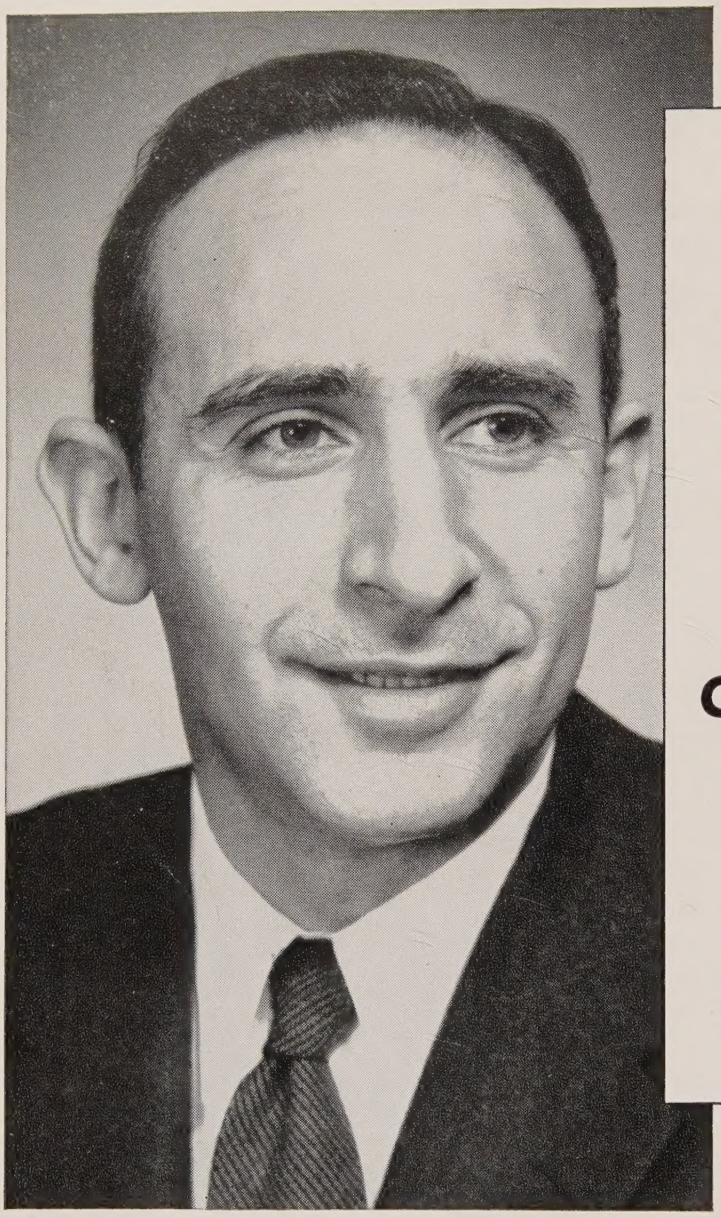

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Norman R. Parmet
Tell You Why

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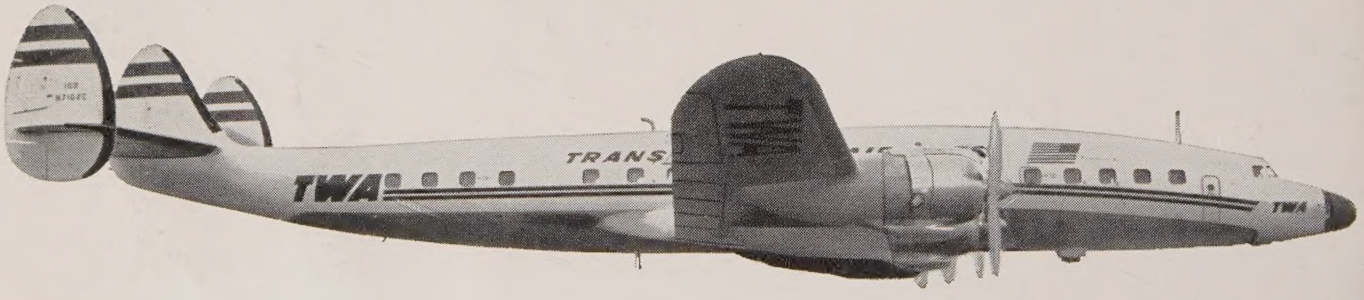
Spark Plugs!



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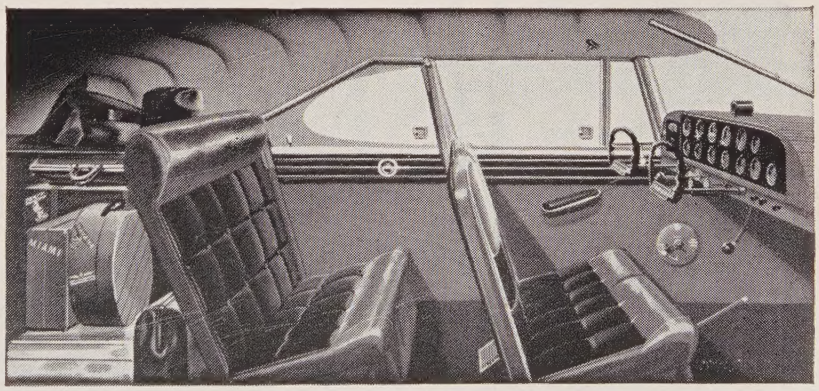

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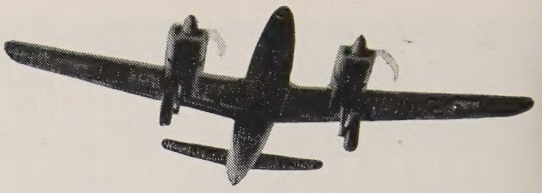

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MAY, 1955

Skyways

The Magazine of Flight Operations

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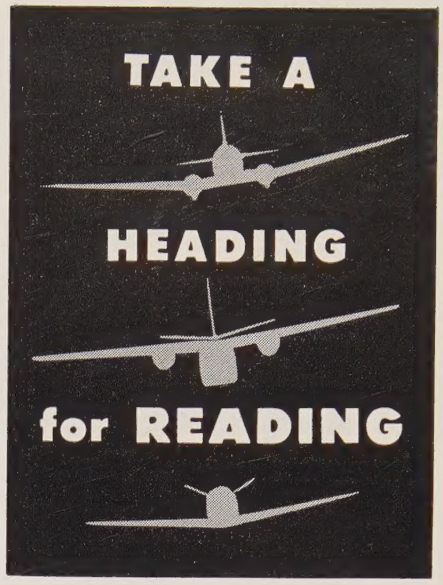

To The

SIXTH ANNUAL MAINTENANCE

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Saturday

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industry notes . . .

■ Contracts recently were signed in Detroit giving Houdaille-Hershey Corporation exclusive manufacturing and sales rights to the Gilfillan Vari-flow high-pressure pump for operating aircraft hydraulic equipment. Compact and lightweight, the Vari-flow pump embodies a built-in inlet supercharger enabling the basic pump to operate as efficiently at extreme altitudes as it does at sea level. Leading aircraft manufacturers have expressed great interest in this Gilfillan development because of its remarkable performance characteristics.

■ Braniff International Airways has announced a $20 million new equipment program which includes the purchase of a fleet of seven Douglas DC-7C's from Douglas Aircraft. Included in the entire program are acquisition of spare parts and special shop equipment for maintenance purposes. Braniff will receive its first three 7's in the fall of 1956, the remaining four during the early part of 1957. The Braniff 7's will seat from 62 to 81 passengers.

■ The New York Life Insurance Company reports it is now offering life insurance with full aviation coverage for the face amount to production-line test pilots. Formerly, such pilots were offered policies only with an aviation exclusion clause. Full aviation coverage now is offered for an extra premium of $10 yearly for each $1,000 (up to $25,000) of life insurance.

■ The McDonnell F-101 *Voodoo,* the USAF's newest supersonic jet fighter, is being equipped with an automatic electrical system requiring no attention from the pilot. The system was designed in line with current emphasis on simplifying the pilot's job through the use of automatic equipment. The new electrical system offers additional improvement in that it operates at full rating when exposed to the high temperatures encountered in supersonic flight. The *Voodoo* is being assigned to SAC.

■ Bell Aircraft recently revealed that more than a quarter of a million dollars worth of orders have been placed for its new Lycoming-powered Model 47G helicopter, first deliveries of which were made last month (April). One of the 47G's is bound for France and work in the Swiss Alps, two others go to Canada for aerial mapping in northeastern Canada; two more go to Seattle for work in the Pacific northwest, while others are scheduled for operation in the southwestern U.S.

■ Lockheed is delivering new *Super Constellations* to five world airlines, each of these *Super Connies* to be equipped with 600-gallon wingtip fuel tanks. With these extra tanks, the 1049G gains up to 850 miles in extra range, bringing its distance capacity to 4,620 miles with reserves or 5,840 miles absolute.

■ United Air Lines has signed a contract with the Radio Corporation of America for delivery of 200 C-band (5.5-cm) airborne radar units at a cost of $2,500,000; modification of the planes and installation will require another $1,500,000. Installation will be made at United's San Francisco maintenance base.

■ British Overseas Airways Corporation has 18 Mark 300 *Britannias* on order for BOAC's London to New York run. Powered by four *Proteus* 4,150-hp turboprop engines, the 90-passenger *Britannia* has an economic cruising speed of about 400 mph, a range of 6100 miles with a 16,000-lb payload, or 4500 miles with a 30,000-lb payload. The *Britannia* presently is undergoing tropical trials in Africa.

■ Convair Division of General Dynamics Corporation has announced the purchase of six model 340 Convair-Liners by Saudi Arabian Airlines. The $6 million purchase by SAA includes spare parts, engines and other equipment. Deliveries are scheduled to begin immediately and to be completed by middle June.

■ The USAF's first production turboprop, the Lockheed C-130A *Hercules,* made its first flight recently and powered itself into the air in about 800 feet. The C-130's engines are Allison T-56's geared to three-bladed Curtiss-Wright turbo-electric props. Designed exclusively as a military cargo and personnel carrier, the *Hercules* can airlift up to 20 tons of cargo.

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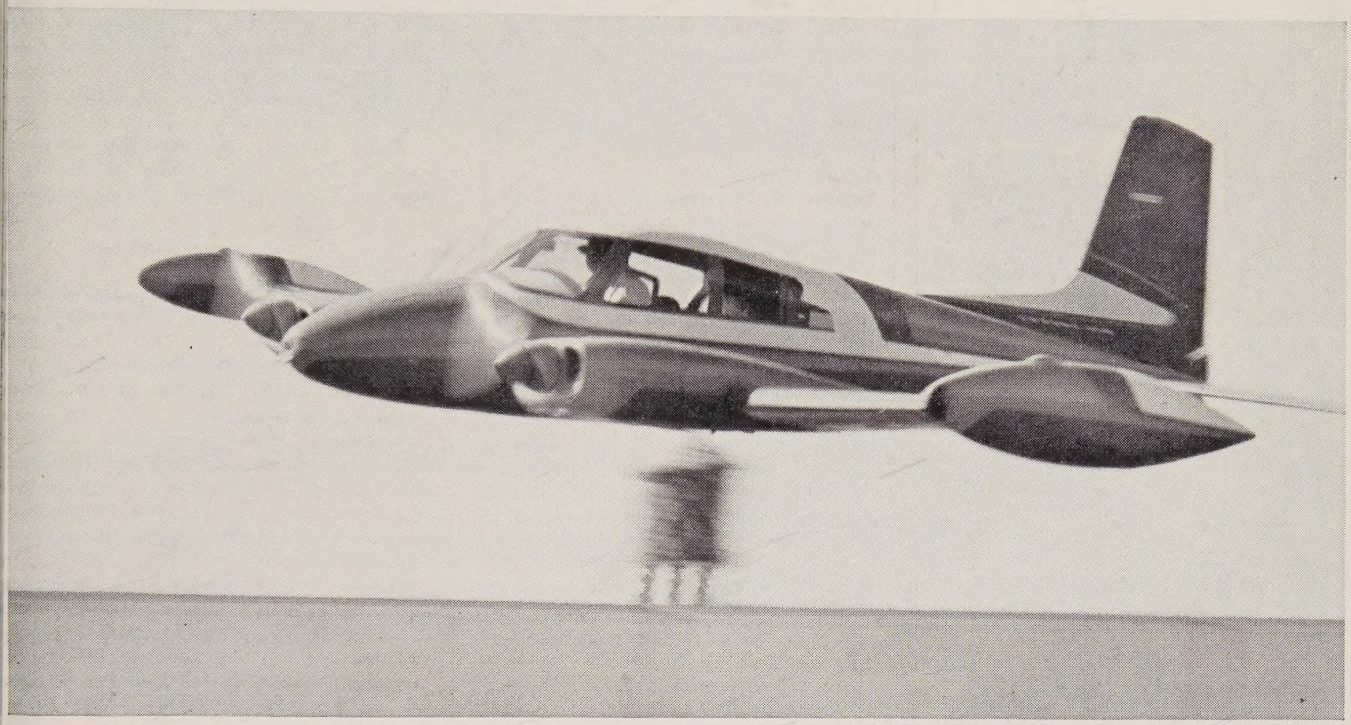

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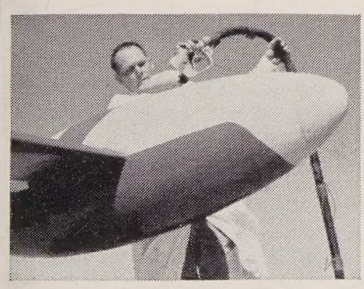

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Foam rubber seats—adjustable and over 4 ft. wide in back, adjustable and reclining in front! Wide (40 in.) door offers easy entrance to front or rear of cabin. Four striking exterior color combinations with matching interiors. Large heating-ventilating system with 8 outlets and defroster. Wide, shock-mounted panel takes maximum combination of instruments and radios. Spacious shelf area. Large luggage compartment is easily reached through cabin or outside door.

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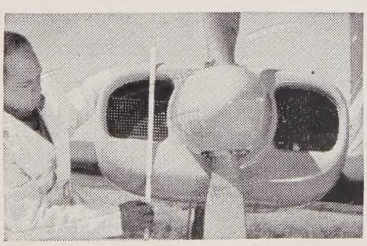
Flat nacelles are only 21 in. deep! Powerful 240 h.p. slow-turning engines with all-metal constant speed, full feathering props, added thrust gained from exhaust augmentors. Waist-high engines, easily serviced.



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PERSONNEL

Joseph P. Adams has been named by President Eisenhower to serve as Vice Chairman of the Civil Aeronautics Board. **F. M. Stone** was named by the CAB to serve as General Counsel.

Howard E. Roberts was appointed general manager of the American Helicopter Division of Fairchild Engine & Airplane Corp.

George M. Messenger has been named vice president-maintenance for The Flying Tiger Line. **J. P. Goldsmith** was named director of contract operations, and **Edward Pinke** has become superintendent of flight operations. **Frank Lynott** has been named director of freight operations, and **John L. Higgins** has been appointed director of sales for The Flying Tiger Line.

Elton J. Smith recently was appointed chief experimental pilot for Bell Aircraft's helicopter division.

Emile S. Sherrard has joined the staff of the National Bureau of Standards to conduct research on analogue computing systems.

Perry R. Roehm was appointed a vice president of Norden-Ketay Corporation and is in charge of coordination of sales and product engineering.

Rear Admiral Malcolm F. Schoeffel, USN (Ret.), Joined General Precision Equipment Corporation as director of weapons planning.

Lewis G. Sinning was named director of procurement of Piasecki Helicopter Corporation.

Everett H. Schroeder has been placed in charge of Kollman Instrument Corporation's airline contracts.

Major General Gordon P. Saville, USAF (Ret.), recently was appointed director of Office of Military Requirements of The Ramo-Wooldridge Corp.

H. Grady Gatlin, Jr., has joined the Air Transport Association's Regulatory Section of Operations. He assists **Jack Bowman** who was named to head the unit.

William F. Moore was named manager of marketing for General Electric Company's Aircraft Accessory Turbine Dept.

Hayward F. York has been appointed operating manager of the Chrysler Jet Engine Plant, Detroit.

William R. Beckerle was appointed sales engineer for the Eastern territory for Weston Hydraulics, Ltd.

LCmdr John E. Stewart, USN, recently was assigned as Bureau of Aeronautics representative at Hamilton Standard.

Bruce A. Willsey has been named assistant plant manager of Solar Aircraft's Des Moines, Iowa, plant.

T. J. Dalton was appointed sales and service manager of NASCO, Inc., distributors of aviation instruments and accessories in Miami, Florida.

William Carl has been named assistant sales manager of the Electronics Equipment Division of Air Associates.

Alexander MacGillivray recently was appointed director of finance of Hughes Aircraft Co.

Edward J. Rhoades was appointed plant manager of Mattel Engineering Company.

Ray Gayner of Northrop Aircraft has been named assistant to the vice president in charge of manufacturing. **George Douglas** has been made assistant chief engineer, Northrop.

John Young, Jr., recently was appointed agency and interline sales manager for SABENA Belgian World Airlines.

COMPANIES

Weber Aircraft has set up a new field service department. **Max Stark** heads up the new operation.

KLM Royal Dutch Airlines has ordered 10 Douglas DC-7C's for its New York to Amsterdam run.

Okanagan Helicopters Ltd., of Vancouver has purchased Canadian Helicopters Ltd., of Toronto and its subsidiary Smart Aviation Ltd. The newly acquired organizations will continue to operate as separate companies.

Trans World Airlines is lending Deutsche Lufthansa, the services of 11 of its pilots. The TWA captains will conduct pilot training and assist in the trans-Atlantic operation of the revived German airline.

New York Airways, Inc., has become the first scheduled all-helicopter airline to join IATA.

AERO CALENDAR

May 3-5—First International Aircraft Mart Exposition, Will Rogers Memorial Coliseum, Ft. Worth, Texas.

May 4-6—Fourth Annual International Aviation Trade Show, 69th Regiment Armory, New York City.

May 5-7—National Intercollegiate Flying Association convention and air meet, Meachan Field, Ft. Worth, Texas.

May 9-11—Institute of Radio Engineers national conference on aeronautical electronics, Biltmore Hotel, Dayton.

May 17-19—AIA annual board meeting of governors, Williamsburg, Va.

May 20-22—Tampa Centennial Aviation Fiesta, Tampa, Florida.

May 21-22—Weekend Fly-In sponsored by Lockbourne Chapter of SAC Aero Club, Lockbourne AFB, Columbus, Ohio.

May 31-June 4—Aviation Writers Assn. Convention, Montreal and Toronto.

June 6-10—Human Engineering Institute, Dunlap and Associates, Stamford, Conn.

June 9-11—Sixth All-Women's International Air Race, Washington, D.C. to Havana, Cuba.

June 11-12—Annual New England Air Tour, Bar Harbor Airport, Bar Harbor, Maine.

June 12-17—SAE summer meeting, Atlantic City, N. J.

June 18-25—Annual Transcontinental Air Cruise, Palm Springs, Calif to Philadelphia.

June 21-24—Joint meeting IAS and RAS, IAS Bldg., Los Angeles.

June 21-24—ADMA mid-year meeting, Breezy Point Lodge, Brainerd, Minn.

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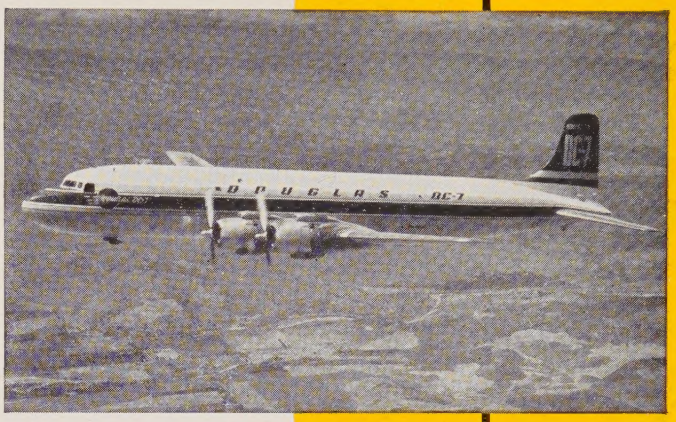
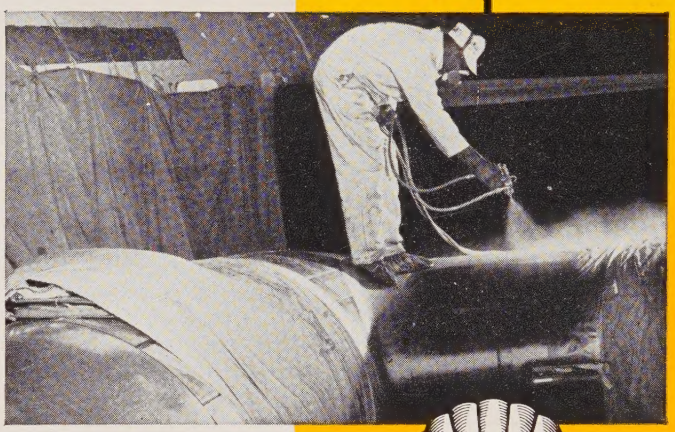


Above right

Douglas DC-7, new record-breaking luxury airliner.



Applying Epon resin-based "Cat-A-Lac" to exterior wing section of a Douglas DC-7. Cat-A-Lac is manufactured by Finch Paint and Chemical Co., Torrance, California.

FIRE-RESISTANT hydraulic fluid, widely adopted by the airlines, attacks ordinary paint. Faced with this problem, materials experts of Douglas Aircraft Company began a search for a protective coating that would stand up to synthetic hydraulic fluid, as well as wind and rain, erosion at air speeds of 300-400 mph, and corrosive exhaust deposits.

In several years of investigation, more than 300 formulations were tested. *But only "Cat-A-Lac" formulated from Epon resins*, applied in exhaust path areas, was *100% intact after more than 1000 hours in actual airline service.*

Because of the unusual durability of Epon resin-based coatings, they have been adopted by Douglas and leading airline operators for plane areas exposed to hot exhaust gases, gasoline, hydraulic fluid and cleaning solvents.

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TWA Installs Weather Radar in Super Constellation

by Richard N. White
Mgr., Electronics Engineering, TWA

World War II experience indicated airborne radar might be very valuable for detecting and avoiding thunderstorm areas and turbulence. This conclusion was supported by some postwar 3.2-cm radar flight tests by American Airlines. As airline interest in airborne radar increased, the Air Transport Association formed a committee to formulate airline radar operational requirements.

The ATA committee concluded that the primary function of the airborne radar equipment should be cockpit display of dangerous weather. They decided that other features, such as terrain clearance, terrain mapping and nearby aircraft display, should be considered by-products of the primary function. Also, they specified that a wave length should be used which would penetrate and display at short range the precipitation area having a precipation rate of 60 mm per hour and a depth of 10 to 15 miles.

The ATA committee gave these operational requirements to the Aeronautical Radio, Inc. Airlines Electronic Engineering Committee (AEEC) and asked them to draft a characteristic for radar equipment meeting the operational requirements.

The primary emphasis given to display of dangerous weather and the rainfall penetration requirements dictated that the wave length be optimized for weather penetration. The unanswered question of optimum wave length needed to meet this requirement placed the equipment committee at the focal point of some very spirited discussions between the proponents of 3.2 and 5.6-cm wave lengths.

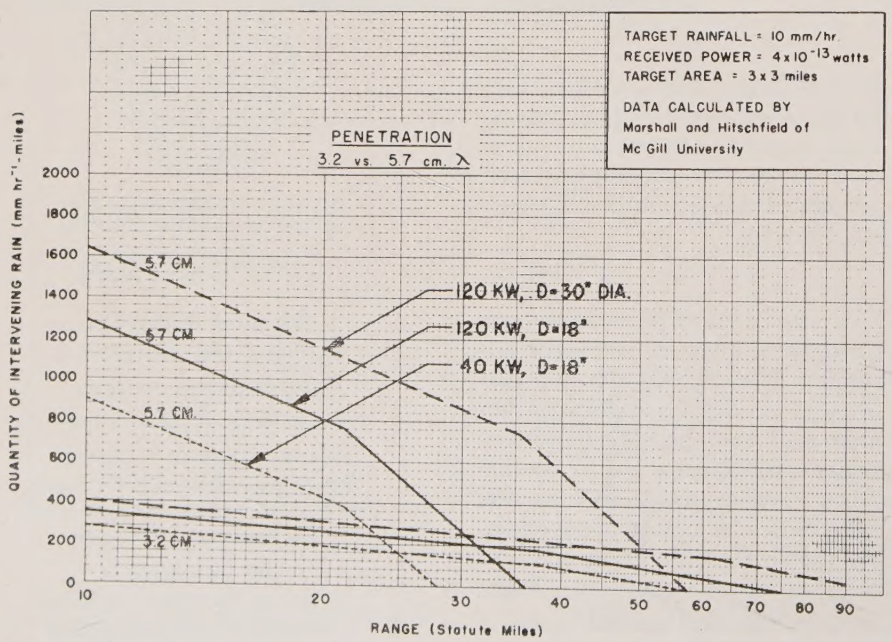

FIG. 1—*Chart shows relationship of maximum usable range to assumed target vs. intervening rainfall, power, wave length. Chart was developed from McGill University report*

After examining available data, the committee recommended that the wave length question be studied further by means of a study contract with McGill University under joint ATA and ARINC sponsorship. The McGill group was asked to calculate the relative range and penetration, assuming two power levels and two antenna dish diameters, at 5.7 cm and 3.2 cm. Dr. J. S. Marshall and Dr. Walter Hitchfield conducted McGill University's project and released a final report in February, 1953.

In summary, the report stated that 3.2-cm radar was better for detecting distant targets with little or no intervening rainfall but 5.7-cm radar could better penetrate heavier intervening rainfall and "see" targets beyond the rainfall area with less distortion. Thus, for best "penetration" 5.7-cm radar was recommended. Many weather radar authorities believe this penetration characteristic is very important if we want to fly in thunderstorm areas and avoid as much turbulence as possible.

Fig. 1 is taken directly from the McGill University report. It shows the relationship of maximum usable range to an assumed target *vs.* intervening rainfall, power and wave length. The ordinate is the product of rainfall density in millimeters per hour and the distance through the intervening rainfall. With zero intervening rainfall, the 3.2-cm range is greater than the 5.7-cm range. But at the higher intervening rainfall densities, 5.7 cm gives greater range.

According to the McGill report, "A frontal line of showers is likely to involve the passage of the radar beam through a few hundred millimeter/hour-miles of rain, probably, though not certainly, less than 500." Taking a more conservative figure, say 300 millimeter/hour-miles, and assuming each radar has a 30-inch antenna and 120-kw power, 3.2-cm radar will

give 20 miles range while 5.7-cm radar will give 47 miles range. At 180 millimeter/hour-miles the range is equal for the two wave lengths at 51 miles. The sharp break in the curves occurs at the range where the angular dimensions of the target become less than the nominal angular beam width, in other words, at the range where the target just fills the beam.

The 3.2-cm radar gives better target definition than 5.7-cm radar using a given antenna. The 3.2-cm can also interrogate existing military ground beacons. Thus, neither 3.2 nor 5.7-cm radar is superior on *all* counts.

In TWA's opinion, each airline must answer the wave-length question for itself by weighing the capabilities and deficiencies of the two wave lengths against its own operational requirements. TWA did this and reached these conclusions:

1) TWA believes that radar information permitting the pilot to avoid storm areas entirely is not enough, particularly because aircraft are often confined to closely-shaped airways which allows very little lateral deviation. Twenty-odd years of operational experience shows that two airplanes can be quite close together in the same thunderstorm area, yet one may fly through the area with very little turbulence while the other aircraft experiences considerable turbulence. Thus, one major requirement in our opinion is to determine the smoothest path through the thunderstorm area while the aircraft is actually in heavy rainfall associated with that area. This requirement dictates maximum penetration and minimum target distortion due to rainfall attenuation. This, in turn, dictates the longer wave lengths which have lower rainfall attenuation.

2) The existing ground beacons are of only secondary importance because their siting is not optimized for TWA routes. (However, we recognize that usefulness of these beacons might be a very important deciding factor for other carriers.)

3) Available data indicates 3.2-cm radar terrain mapping might show more detail than 5.6-cm mapping. However, there is not enough difference to make this fact a major factor in our wave length choice because we have no primary requirement for using fine detail from terrain mapping as primary navigational information.

4) Many aircraft cannot use antennas larger than 18 or 20 inches in diameter. The nose of TWA *Super Constellations* can contain a 34-inch diameter antenna. This larger antenna enables us to regain all of the definition loss resulting from the use

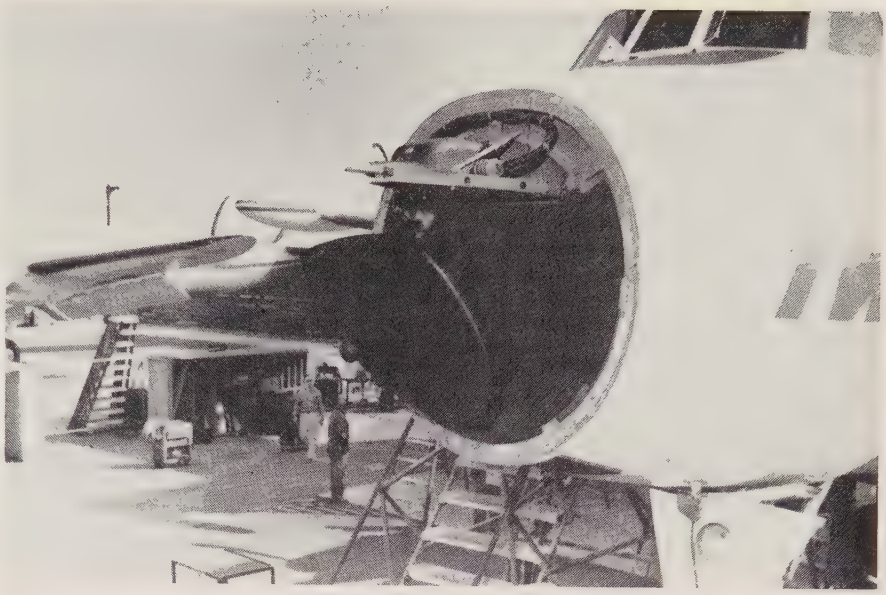

FIG. 2—*Upper extremity of antenna dish in 1049G's nose was removed to permit the largest possible dish diameter. This reduced vertical plane definition but not horizontal definition*

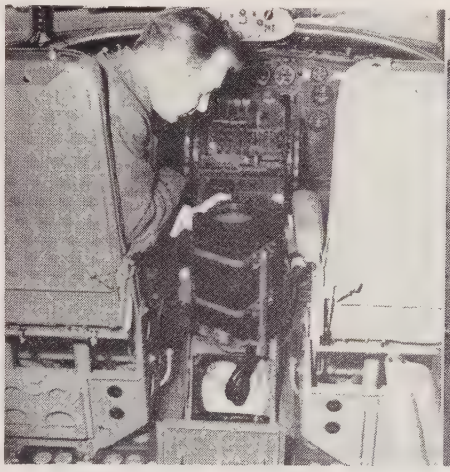

FIG. 3—*Scope, located between pilots is shown in raised, normal operating position*

FIG. 4—*When not in use, the radarscope telescopes out of the way into the floor*

FIG. 5—*Control panel is located in center of instrument panel glare shield convenient to both pilots; most used items are on first pilot's side. Photo shows panel assembly*

of the longer 5.6-cm wave length. (A 34-inch dish at 5.6-cm gives approximately the same half-power beam width as an 18-inch at 3.2 cm.)

5) The 5.6-cm flight tests conducted by United Air Lines during the summer of 1953, seemed to confirm the McGill conclusion that 5.6-cm radar was superior for rainfall densities in thunderstorm areas.

For these reasons TWA favors the 5.6-cm wave length even though the wave length controversy still continues to some extent among highly qualified radar specialists. The Airlines Electronic Engineering Committee recognized this and in our opinion made a very wise decision. Their specification includes standardized radar mounting and interwiring provisions, thus permitting any operator to wire his airplane in a standard manner and plug in either 3.2 or 5.6-cm equipment as he desires. Thus, any airline operator can install standard mounts and wiring and evaluate various equipments or one wave length against another.

Installation: The installation portion of the Aeronautical Radio characteristics was completed just in time to permit negotiations with Lockheed Aircraft Corporation for radar installation provisions in our 20 new 1049G *Super Constellations.*

The first of these aircraft went into scheduled service on April 1, 1955. It has a complete 5.6-cm installation using RCA equipment. Two more equipped aircraft will begin scheduled service in April and May, 1955. The remaining 17 aircraft will be delivered with complete radar provisions minus the radome. Interchangeable metal noses will be installed temporarily. The radome is de-iced by inflatable rubber boots.

The *Super Constellation* nose was modified to accommodate a 34-inch diameter antenna. As compared to the widely used 18-inch antenna, this antenna increases the clear-air range about 60% and almost doubles the angular definition. The antenna has line-of-sight type stabilization in accordance with the Aeronautical Radio characteristic. Line-of-sight stabilization is much simpler than platform type stabilization (which holds the antenna rotation axis normal to the earth's surface in any normal aircraft attitude). We believe this simplicity more than offsets the slight pictorial distortion occuring at higher bank angles.

A Lockheed-designed submerged VOR antenna is installed immediately behind the antenna assembly and makes use of the space volume between the original nose contour and the new contour. The dimensions of this space happened to be optimum for a submerged antenna operating in the VOR frequency range. This new VOR antenna was an unexpected but very welcome by-product of the radar installation and enables us to remove the familiar "goathorn" antenna from the top of the aircraft.

Fig. 2 shows the nose with the radome removed. The upper extremity of the antenna dish was removed to permit the largest possible antenna dish diameter. This reduces the definition in the vertical plane but has little effect on the horizontal plane definition. A Collins glideslope antenna is installed on the forward vertical surface just above the antenna dish.

Space limitations in the *Constellation* cockpit seriously limited the number of usable locations for the scope unit. Originally, we wanted separate scopes for the pilot and copilot mounted just below the flight instrument panels, one scope immediately left of the pilot, the other immediately right of the copilot. When the scope design was completed, we found we didn't have enough room in those locations. The final location chosen is shown in *Fig. 3.* It shows the scope raised to the normal operating position. In this position it can be used by either pilot. When the scope is not in use, it telescopes out of the way, *Fig. 4.*

The main control panel is located in the center of the pilot's instrument panel glare shield. It is convenient to both pilots. *Fig. 5* shows the control panel assembly.

Originally, we wanted the transmitter-receiver unit installed in the forward radio rack to give maximum maintenance accessibility. This location required a long and difficult-to-install wave guide run with many wave guide joints and fittings. This fact plus serious cockpit space limitations dictated a compromise location. Lockheed recommended the nose location which was finally used.

This nose location permits a short wave guide run which will very possibly eliminate some wave guide maintenance problems.

The three initial installations were made possible through special arrangements with the RCA Company. Two of the RCA shipments are preproduction units, the third is their first production unit. These aircraft installations will give RCA an opportunity to accumulate flight test time very rapidly and will enable TWA to gain considerable radar operational experience.

We hope this experience will enable us to add to the total knowledge about airborne radar's usefulness for detecting, avoiding and flying through or near thunderstorm areas.

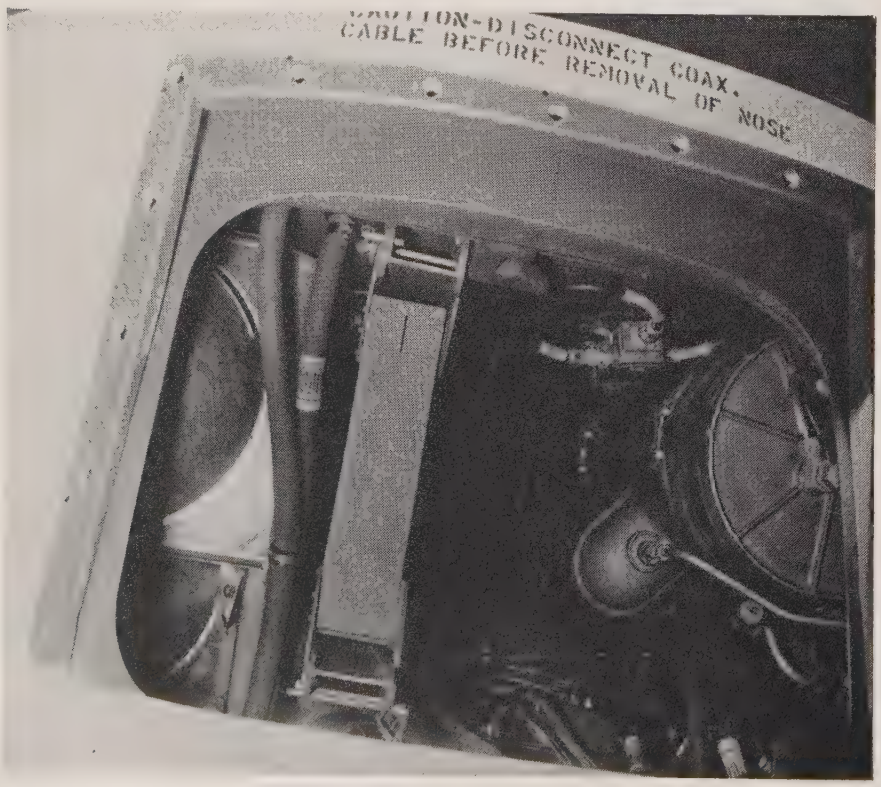

FIG. 6—*This is a view looking upward into the access door on the bottom of the fuselage just aft of the radome. Lockheed installed an elevator device for easy removal of the unit*

This is an adaption of a paper presented by Mr. White at the SAE Golden Anniversary Aeronautics Meeting.

ALPA Air Safety Forum

BNF's Capt. L. H. Mouden reports on activities at Air Line Pilots Association's Annual Air Safety Forum

FLIGHT SAFETY FOUNDATION *citations were presented by Jerome Lederer (left) to United Air Lines' Capt. Thomas D. Boyle, Stewardess Patricia Johnson, and Capt. E. Andreasen*

The ALPA-sponsored 3rd Annual Air Safety Forum packed years of projects into three days of presentations. The Air Line Pilots Association has come of age within the past five years and as such, has recognized the many responsibilities that accompany maturity. One of their major contributions to the aviation industry has been through participation in and promotion of safety and engineering projects.

C. N. Sayen, ALPA president, keynoted the Forum's endeavors: "The purpose of the Forum is to encourage an exchange of experience and knowledge on operational problems among pilots and others. All have much to learn from each other, from the airline pilots and from industry pilots who are faced with most of the same problems as are the pilots of the scheduled airlines."

In the field of aviation safety there are two distinct problems, Sayen pointed out. The first is to preserve the present general level of air safety, while the second is to improve the existing level of safety. With increasing speeds and weights, additional potential hazards are introduced and it is not an easy matter to maintain the existing level of safety. "Only by constant effort and diligent work can the industry prevent the level of safety from slipping." He went on to point out that the pilot's role in the promotion of aviation safety is that of a critical consumer. But that must never be interpreted by pilots as a right to resist new things only because they are new. Neither should aviation forget that change is not necessarily progress. Only when designer, producer, and consumer are able to keep in proper balance can the industry continue raising the level of safety while advancing aviation.

The first session of the Forum dealt primarily with the problems of ALPA's own safety organization. The air safety activities were analyzed and their functions were explained by representatives from various areas of activity. Discussion papers were presented by Theodore G. Linnert and Carl F. Eck, Air Safety and Engineering Department, Chicago; J. D. Smith, Chairman Regional Safety Committee, New York; Edwin S. Boyce, Chairman TWA Safety Committee, Los Angeles; and Robert F. Stone, Chairman Aircraft Exterior Lighting Committee, Chicago.

The functioning of committees of pilots with special qualifications is one of the most effective means of working on "currently critical" subjects. The pilot group contains men from almost every business and profession. This includes lawyers, ministers, doctors, college professors, certified public accountants, engineers from every field, and many others. The value to the industry in using these latent talents is recognized. This is evidenced by the eagerness of the aviation industry to have these pilot groups cooperate with them in solving their mutual problems.

A relatively new subject of paramount interest to aviation operations was the topic of discussion for the first afternoon session—"Visual Aids to Airport Qualification Presentations." This was preceded by a demonstration of the use of conference techniques by Leonard C. Smith, Senior Engineer, National Safety Foundation, to help the Air Safety Forum delegates get the most good out of the discussion sessions.

The use of visual aids as a means of airport qualification has become a topic of considerable importance. All pilots operating under Parts 40 and 41 of the CAR are required to have visually inspected a scheduled, provisional, or refueling airport before they can make an approach and landing under IFR conditions. The time required to qualify over Domestic and International routes has made this a real chore for the pilots. The cost involved in such required-qualifying makes this an economic factor to be considered by the operators. The pilots and industry representatives recognize the potential economic and safety value of a pilot being able to "look at an airport before getting there" by means of visual aids available from a special "library." The assembled group saw three different visual aid films. Jerry Fairbanks showed Fairbanks Studio's production of a 16-mm color cinemascope sound motion picture of the San Francisco airport.

Sam Davis of American Air Lines demonstrated AA's 35-mm color film strip of LaGuardia airport. This was synchronized with an LP record which furnished the commentary and also advanced the film strip automatically by means of a high frequency signal "audible" only to the projector mechanism.

Captain Wm. Moss presented Pan American Airways' 16-mm sound motion picture on LaGuardia Airport. This included a filmed briefing on the weather, traffic, and runway conditions peculiar to the LaGuardia area, and then showed the approaches to the various runways in cinemascope color, as seen from the cockpit.

(*Continued on page* 26)

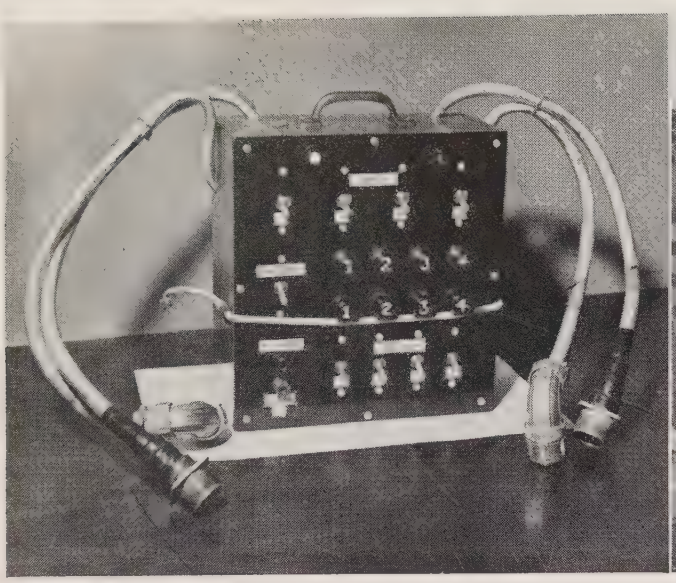

FIG. 1—*Pan American Airway's portable fire and trouble warning simulator is connected to aircraft's fire-warning system*

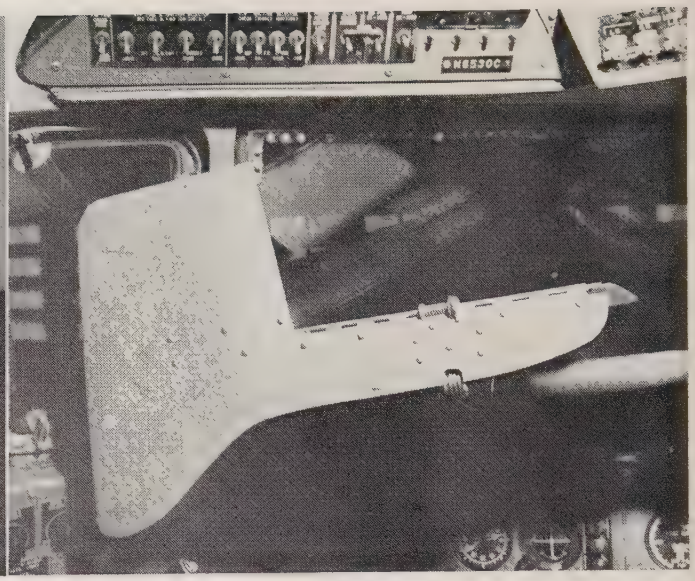

FIG. 2—*At start of the take-off run, the hinged flap of the "hood" is down and trainee's vision is relatively unimpaired*

Pilot Training Program

By Capt. Wm. W. Moss

Asst. Chief Pilot—Training,
Atlantic Div., Pan American World Airways

Three years ago in presenting some line pilot views in "The Airline Pilots Look at Safety" (*SKYWAYS, May 1952*), I said, "An integral part of operations and safety is training. It is obvious that constant training and checking in both old and new procedures is one of the cornerstones of flight safety." Now, after a year and a half of being in charge of the training of more than 500 pilots of the Atlantic Division of Pan American World Airways, I find that I am still in complete accord with my feelings of three years ago. It is important, however, to put training and checking in the proper perspective. When discussing pilot proficiency programs, you often find a tendency to lump them together and to assume that training is simply being given a check ride or, conversely, that a check on a man's ability is being obtained during a training period. To a very limited degree this is true, but it should be realized that there are separate and distinct requirements for both training and checking and that these requirements can best be satisfied by separate treatment within the framework of an over-all program, both ground and flight, dedicated to the attainment and maintenance of pilot proficiency adequate for the safe and efficient operation of the airline, and secondarily to the gradual raising of competency in order to permit more efficient operation of present equipment and to be ready for the transition to future aircraft.

Checking is important for two reasons:

1. It provides the measure of a man's ability. It is the "go, no-go" gauge as to whether a pilot's skill is adequate to cope with the tasks he may be called on to face any time during his career. As such it has many implications in the moral, legal, financial, and regulatory fields.

2. It shows the areas where training is necessary to raise the group standard and it pinpoints the individuals who need more training than the average. This has economic benefits because it permits the attainment of a high group standard with a minimum waste of expensive training time on men whose proficiency is high.

In order to achieve these benefits of checking, a man's ability should not be shielded behind recent training. This is why we advocate the "cold check"; namely, one *not immediately preceded by a training period*. Thus, we get a good picture of how the man would have handled the problem (for example: single- or two-engine landing [depending on equipment], zero flap landing, engine failure on take-off, etc.) if it had occurred on his last scheduled flight. This may be an unpopular procedure with some pilots, but we believe it is consistent with the hard fact that unless a pilot is adequate at any and all times to handle an in-flight emergency, an accident is likely to arise out of an incident. But, how do you retain this ability to meet emergencies? You can't cut engines on scheduled flights, or make zero flap landings with passengers. Training is obviously the answer; realistic training divorced from the checking; training that covers the maneuvers that are not normally practiced by a pilot on routine flights, but which are likely to be encountered from time to time. This, then, is the background reasoning which has led to the evolution of the PAA Atlantic Division pilot training program for Captains and First Officers.

Briefly, this program consists of the following periods scheduled by calen-

dar months over a period of a year:
Month 1—Periodic Technique Check
Month 2—Link Trainer—DC-3 Refresher
Month 3—
Month 4—Ground School Refresher —4 days
Month 5—Periodic Instruction (Flight)
Month 6—
Month 7—Periodic Technique Check
Month 8—Link Trainer
Month 9—
Month 10—Ground School Refresher —4 days
Month 11—Periodic Instruction (Ground)
Month 12—

The months left blank may be utilized to provide flexibility in scheduling and the listed periods may be moved ahead or back as scheduling needs dictate. However, in compliance with CAR 41.53, Periodic Technique Checks must be accomplished twice each year at intervals of not less than four months.

We feel that this program accomplishes the following:

1. *Provides a balance between training and checks.*

The divorcing of check and training flights provides a better picture to both the pilot and the company of the pilot's proficiency while at the same time providing an adequate opportunity for practice and instruction.

2. *Greater safety.*

It is felt that a high level of competency will exist year round by spreading the training more evenly. This gives the pilots opportunity at regular intervals to come into contact with people who can bring them up to date on new procedures and who can answer any questions that may have come to mind since the last training period.

3. *More flexible scheduling.*

Having to schedule around a maximum period of only four days, in contrast to almost two weeks when all training and checks were lumped together twice a year, makes for a more uniform schedule which is advantageous to both company and pilots and is a safety factor in that it avoids disruption of normal routine.

The best thought-out outline is useless, however, unless the details are properly filled in, so next I would like to show you what the listed periods actually are, what they cover, and why we give them.

The periodic Technique Check is really the heart of the program in that it is the legal requirement and in that the performance on it determines the amount of training a pilot gets. In establishing the items we give on this check, we have endeavored to get away from "just going through the motions." We make all maneuvers as realistic and as practical as possible by cutting engines just at V_1, by landing out of ILS approaches to minimum or below minimum altitudes, by doing three-engine go-arounds from right down at the flare point with gear down and full flaps, and by providing realistic fire-warning signals by means of a "black box."

In attempting to convey this realism, however, we try to balance the safety benefits to operations against the hazards of training. In other words, we feel that it is very poor policy to carry our realism to the point where we are seriously exposing ourselves to a preventable accident during training. Up to a few years ago, we cut the engines with the mixture control and either automatically or manually feathered the engine right down on the deck. That, however, was just a little too realistic although, undoubtedly, excellent training. After a few very close calls of confusion in the cockpit, poor technique, feathering the wrong engine, etc., we reverted to pulling back the throttle, being very careful, however, not to pull back into reverse. To simulate feathering, on the command, "Feather # One" (or two or three, etc.), the training engineer sets zero thrust which, for a DC-6B, we calculate is 1200 rpm and 15 inches manifold pressure at 125-130 knots.

We believe that one of the most critical maneuvers a pilot can face is the sudden loss of an engine immediately after V_1 on a barely adequate field. It is a maneuver which calls for some very quick and correct actions, and they must be *both* quick and correct or a dangerous situation exists. So we emphasize this maneuver on both training and checks by cutting an outboard engine right at or immediately after V_1. Since most of our DC-6 training is done at approximately maximum landing weight on the 5,000-foot runways at MacArthur Field, the pilot gets a fairly realistic picture of the performance of his aircraft, especially on summer days.

Incidentally, holding an aircraft on the ground while accelerating from V_1 to V_2 after losing an engine and while the end of the runway and the obstructions are approaching at some 200 fpm, is probably the most difficult unexpected job a pilot will ever have to do, but it is extremely vital to the obtaining of the proper performance from the airplane. As such, I

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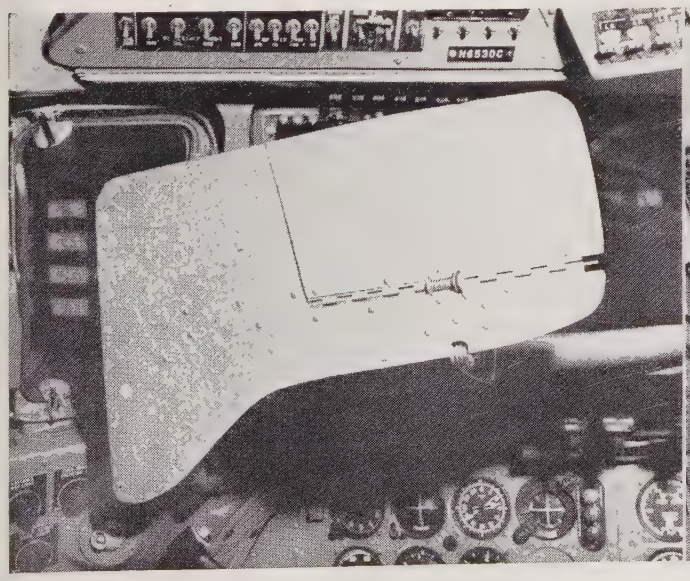


FIG. 3—*At about 10 knots before V_1, the Check Pilot raises the hinged flap and rest of take-off is solely on instruments*

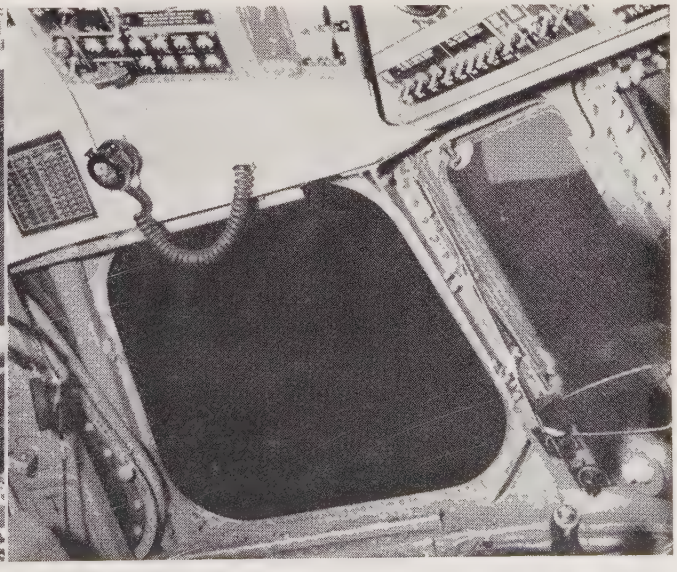


FIG. 4—*Photo taken from right-hand pilot's seat shows how this arrangement eliminates obstruction to instructor's vision*

ROUND TABLE *on VFR flying in high-density areas was attended by (left to right) Bill Parenteau, Chief, LaGuardia Tower; Capt. Fred Shaw, American Airlines; Bob Smith, Chief Pilot, Kudner Agency; Jim Rogers, pilot, Swiflite Aircraft; Max Karant, AOPA; Neil Fulton, pilot, Olin-Mathiesen Chemical; Capt. Ed Pangburn, American Airlines, who served as moderator; Randy Carpenter, Air Transport Section, Flight Safety Foundation; Capt. Bob Tuxbury, United Air Lines; Capt. Owen C. Ross, Capital Airlines; and C. J. Stock, Chief, Airways Operations Division, CAA, at New York International (Idlewild) Airport*

SKYWAYS FLIGHT OPERATIONS ROUND TABLE

MAY 1955 *Wings Club, New York*

Hazards of VFR Flying in High-Density Areas

Sheldon E. Pangburn (*Captain, American Airlines*):

"Gentlemen, we are here to discuss that ever-controversial subject of VFR flying in high-density areas, and the hazards attendant thereto. It would be easy to make accusations, relate various incidents and attempt to act as a hearing board for guilty parties, but that wouldn't get us anywhere. Instead, I hope that we, the people who fly these airplanes and are directly associated with the problem, both from the air and on the ground, can take advantage of this forum that SKYWAYS has made available to us, and reach some agreement on this particular problem.

"It is obvious to all of us that mid-air collisions are on the increase; that near-misses are on the increase. It's probably safe to say that for every near-miss incident that is reported, there are 10 that are not. The subject is a complicated one with many ramifications, and there are a lot of interests to be served, but the public interest should be our main concern.

"To start this discussion, let's hear from the airline pilot's side of the picture. Capt. Owen Ross?"

Capt. Owen C. Ross (*Capital Airlines*): "There should be no VFR traffic in any control area or zone, let alone a high-density area. I'm sure all of us have had a number of experiences involving the presence of other aircraft. We are naturally more alert for other aircraft on approaches or in high-density areas, but it is impossible for one or two pilots to stay alert with eyes glued ahead and to the sides throughout an eight-hour flight. With the present traffic set-up and the number of planes operating, it is impossible to limit the airways to IFR flight under all conditions. However, I think it is something that must come about within the next few years."

Capt. Pangburn: *"Narrowing it down for a moment, in what respect would you consider the present regulations inadequate."*

Capt. Ross: "The required visibility for VFR traffic is one of the evils. With the high closure rate of today's airplanes, unless you see an airplane when it first comes within the VFR limit, it's going to be closing so fast if he's at your altitude that you have to take violent action to avoid him. I have had two such experiences within the last few months.

"Another thing, visibility measured from a cockpit is a variable thing and subject to the judgment of the pilot. Under certain haze and light conditions, you may think

you have three miles, but when a plane suddenly looms up out of the mist, you realize you have only one-half to a mile."

R. L. Tuxbury (*Captain, United Air Lines*): "I'd like to point up a couple of other instances that fit right into what Capt. Ross said about the 3-mile minimum being too low in this age of high-speed aircraft. Number one is at night with all the lights. The Grimes light has been a big improvement in helping us spot aircraft, but it doesn't give the direction of flight. Also, depth perception is difficult if you are looking at only one light. You may believe the other plane is a long way off . . . and then suddenly find yourself practically on top of it.

"Another problem involves the 5 o'clock take-off to the west and a climb into the sun. Visibility may be 15 miles on the ground, but it isn't from where you sit in the cockpit. It is impossible to pick up an aircraft ahead of you under those conditions. You are completely dependent upon the other fellow looking out for you.

"Still another problem has to do with rates of descent. I happen to be flying DC-7 equipment which cruises and descends faster than the DC-6. As you all know, there are a great many of those two types of aircraft, along with *Constellations*, in our high-density areas. You put a DC-7 at an altitude below a DC-6 and then have the -6 start his descent before the -7 does, and you have the makings of a mid-air collision. It's a situation over which a pilot has no control."

R. H. Carpenter (*Chief, Air Transportation Division, Flight Safety Foundation*): "In the opinion of Flight Safety Foundation, we must have positive control in all of the definable high-density areas. It is entirely possible to create a situation where two aircraft, each essentially legal but one of them uncontrolled, can collide. The raising of visibility limits for VFR flight is a partial step in the direction of solution. However, while strict compliance of the visibility limits might be sufficient for the present, it won't be for the faster aircraft of the next four or five years. If there is any question as to whether or not 3 miles visibility is enough today, it certainly won't be enough in four or five years. Current developments by industry do not appear to offer an answer any time in the near future. The Grimes light is just a short step in the direction of solution, and airborne devices do not appear to be feasible as anti-collision equipment. My feeling is that VFR visibility minimums should be raised. I also believe that all aircraft in high-density areas should be required to file flight plans and, therefore, be controlled. And I believe that existing radar installations should be implemented into the existing communications network to assist in maintaining lateral separation of all traffic."

Capt. Pangburn: "*Let's hear something from the men in our control towers. They are the ones who are faced with this problem of conflicting traffic—IFR and VFR.*"

C. J. Stock (*Chief, Airways Operations Division, CAA*): "There is quite a contrast in the operational characteristics of today's aircraft and those that were flying at the time the VFR minimums were first established. At that time the average cruising speed of aircraft in the commercial field was about 158 or 160 mph. Today, we are operating aircraft with cruising speeds in the vicinity of 500 mph. Even though such aircraft will not be expected to operate at such rates of speed in traffic patterns in immediate proximity to terminal airports, the speed of operation in those patterns has been increased proportionately. Therefore, my thoughts in this matter are these: 1) Considerable improvement is needed in weather measurement and we must be able to determine what the weather condition really is. 2) There must be a continuation of efforts in the direction of Grimes lighting, to the end that all aircraft may be better identified during dusk and night operations. 3) A poor man's anti-collision radar must be made available; and 4) There must be improvement in cockpit visibility. It may seem fantastic, but I suggest we consider the bubble-type cockpit as used in our modern jet bombers.

"An increase in VFR minimums definitely is required, both in terms of visibility and cloud clearance. A 2,000-foot horizontal cloud clearance is ridiculous in the light of the speed of modern aircraft. Recently, there was an increase from 500 to 1,000-foot clearance above clouds, but no similar increase in cloud clearance beneath the overcast has been indicated."

William A. Parenteau (*Chief Controller, LaGuardia Tower, CAA*): "Gentlemen, I came equipped with statistics from LaGuardia which show what we are up against, traffic-wise. During January, the average daily operation of 663 was equivalent to the average daily operation last summer. That's a lot of traffic when one realizes that it is largely concentrated in the period between 7 o'clock in the morning and 9 or 10 o'clock at night. We haven't yet reached the point where the controllers want to throw in the towel, but there are peak periods during the day and in the evening when it approaches what we would call

"**AIRCRAFT** *on a VFR clearance can come in with less than 1,000 and 3 with an ATC clearance," reported Bill Parenteau (left)*

"**AOPA** *objects to the idea that the only solution is to keep private aircraft entirely out of this airspace," said Max Karant (right)*

"AT NIGHT *there should be even more regulation," declared Neil Fulton*

BUSINESS *pilots Bob Smith (left) of Kudner Agency, and Jim Rogers of Swiflite called for raised VFR minimums and more honest position reporting by all pilots, business and airline*

'saturation traffic.' If one flies into LaGuardia or any high-density area airport during nighttime peak periods, the average pilot turns on every light he has—cabin lights, wing de-icer lights, etc., so that his aircraft is lighted up like a Christmas tree and will be seen. Most airline pilots do this.

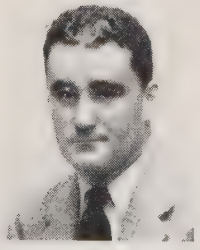
"Perhaps some of you gentlemen remember an earlier SKYWAYS' Round Table at which velocity control in terminal areas was mentioned. It was suggested that on approach to any given airport all aircraft maintain a given airspeed within certain tolerances. That idea still holds good wherever aircraft fly in close proximity to each other. Having them all fly at about the same speed gives the pilot more time to spot a closure and take necessary corrective action.

"I should also like to go on record favoring an increase in cloud minimums for two reasons. The present rate of climb was one of the main reasons the 1,000-on-top was advocated and approved by the whole industry. Now since the rate of descent is in *excess* of the rate of climb, the pilot making his descent has less time following his break-out to dodge the VFR aircraft that may be flying at an altitude 500 ft beneath the clouds.

"Increasing cloud-base minimums to 1,000 feet also would effectively jack up VFR minimums an additional 500 ft. For example, we know that 1,000 and 3 is not VFR in the N.Y. metropolitan area because a pilot cannot be 1,000 ft above the highest obstruction on his route of flight to the airport as well as 500 ft beneath the cloud level and accomplish this with a 1,000-ft ceiling measured at sea level. For a VFR approach from Flatbush to LaGuardia, a 2,000-ft. ceiling would be demanded. Thus, if there were an additional requirement that all VFR aircraft be 1,000 ft beneath the clouds, this would at least jack up VFR another 500 ft."

Capt. Pangburn: *"The consensus of opinion thus far is for a raising of VFR minimums. But before I ask Max Karant to reply to that opinion, I'd like to ask Bill Parenteau a question.*

"A short time ago I experienced a near-miss with an itinerant aircraft in the LaGuardia area. The ceiling was about 700 ft and visibility was 1½ miles. The aircraft



ROUND TABLE PARTICIPANTS

SHELDON E. (ED) PANGBURN (left), moderator of the meeting, has been American Airlines captain since 1942. Before joining AAL, he was a flight instructor.

JIM ROGERS has been an executive pilot for Cities Service (Swiflite Aircraft) since 1950. He has been an active pilot since 1932 and holds a current ATR.

NEIL FULTON, former director of NBAA, learned to fly in 1940 and has since logged 8500 hours. He spent 4½ years as USAF pilot; is now pilot for Olin-Mathieson.

C. J. (BUD) STOCK has been in aviation for 26 years, 22 of which have been spent in air traffic control. He was member of the original air traffic control group, 1935.

R. K. (BOB) SMITH has been a pilot for the Kudner Advertising Agency since 1950. Prior to that, he was a pilot for Capital Airlines, 1942 to '46, 1948 to 1950.

FREDERIC J. SHAW has been a pilot since 1939. He joined American Airlines in '43 and is now a captain and Assistant Director, Flying Operations, for American.

OWEN C. ROSS began his flying career in 1924, his airline career in 1935 with TWA. He joined Capital (then PCA) in 1938, and flew Korean Air Lift in 1950.

R. L. TUXBURY learned to fly as a Navy pilot in 1935. He joined United in 1939 and has taken an active part in ALPA. He is member of ALPA radar committee.

RANDALL H. CARPENTER, Manager of the Air Transport Division of Flight Safety Foundation, is graduate of Kelly Field, Texas, and a former captain with American.

MAX KARANT, Assistant General Manager of Aircraft Owners and Pilots Association, has been private flying's spokesman for many years; is licensed pilot.

BILL PARENTEAU, Chief, LaGuardia Tower, was appointed airport controller in 1942; was assigned to LaGuardia in '45 to work approach control; named Chief, '48.

NEED *for anti-collision radar as well as raised visibilities was agreed to by Capt. Ross (left) and C. J. Stock of the CAA*

"POSITIVE CONTROL *is needed in high-density areas," declared Randy Carpenter, seated next to Capt. Bob Tuxbury (right)*

too close to me for comfort was a Cub *which I later learned was coming down VFR from Bridgeport, Conn. It's my understanding, Bill, that an itinerant pilot may come into LaGuardia under those conditions, providing he comes in under a so-called 'controlled clearance', and he can continue to come in VFR. My question is, what constitutes a 'controlled clearance' under those conditions?"*

Bill Parenteau: "I can't speak for your near-collision with this aircraft that allegedly was VFR, because it obviously was not!"

Capt. Pangburn: *"He was as far as civil air regulations are concerned. But I don't know how he got as far as he did. The near-miss actually occurred between the range station and the airport. I let down from the range and came up in back of him and almost on top of him. Am I right when I state that traffic like that can come in VFR but under some sort of control clearance from the Tower?"*

Bill Parenteau: "Any VFR aircraft can land at an airport with less than 1,000 and 3 provided it receives an ATC clearance. However, it is incumbent upon ATC to provide standard separation at all times between the VFR aircraft so cleared and all others under its control."

Capt. Pangburn: *"But how is that separation guaranteed, particularly with an aircraft and a pilot not equipped to make an instrument approach? Are you depending largely upon the word of a pilot as to exactly where he is?"*

Bill Parenteau: "Certainly. All control is based on the assumption that not only will ATC stick to its manuals of operation but that the pilot will conform to Civil Air Regulations. Occasionally, however, a pilot may say he is at a given point VFR at a time when surrounding weather reports make this unlikely. Under such circumstances, the wise controller will presume that the pilot is mistaken in his judgment of ceiling and/or visibility and will provide proper separation rather than just clear the aircraft to the field VFR, which could prove non-habit forming."

Capt. Pangburn: *"If you had a 300-ft ceiling reported at LaGuardia, and visibility was ½ mile, and an itinerant aircraft taxied out and requested a VFR clearance, would you give it to him, assuming you had no inbound traffic?"*

Bill Parenteau: "Yes. If we had 300 and ½, we would point out what the ceiling and visibility were and clear him for take-off based solely on known traffic. We would not attempt to prevent the pilot from taking off, since we merely clear only insofar as known traffic is concerned. The pilot in that aircraft might take off, but the status of his ticket beyond that point would be questionable. He would probably be held in violation of one regulation . . . 'careless or reckless operation.' "

Max Karant: (*Asst. General Manager, AOPA*) : "Everything said thus far is the considered opinion of professional pilots. All things being equal, perhaps it would be ideal to have positive control over everything, to have the airspace pretty much to yourselves, and to operate by a set of rules and such high minimums that only you could comply with them. Unfortunately, however, you professional pilots are faced with people like us—the private pilots. We look at airspare just as we do the ground and the water. The airspace is a national asset, a public asset just like the highways and the waterways. Down through history there always has been this effort to have things so good, so accurate, so precise and professional that if we ever reached the end of that endeavor, you'd have to turn facilities over to just the experts. AOPA feels there is a happy medium that will involve a minimum of regulations. That minimum must apply to the man who can afford to buy and operate his own airplane and who wants to. He has that right in this country.

"AOPA is seriously concerned with matters of safety. A look at the records will show you that our members suffer more than all the rest of you put together. We are the ones who frequently are knocked down. We want to stop that sort of thing.

"Something was said earlier about airplanes letting down at very high speeds and there was some reference to speed control. All of these things are obvious. You go back through history and what do you find? High-speed trains have to slow down when they pass through communities; so do automobiles. The rules apply to everyone. The minimums are set so that everybody can comply with them; they are not set to meet standards required of bus drivers, for example.

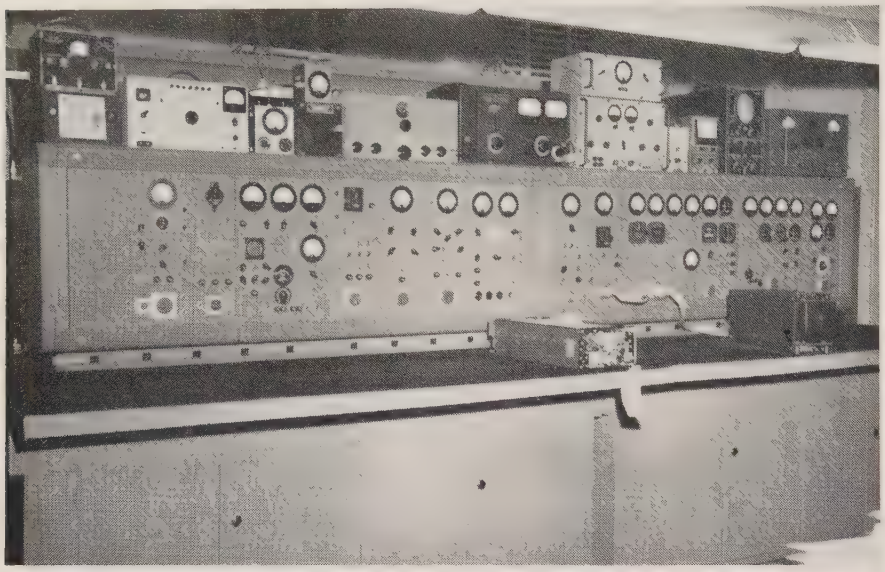
"Provision must be made so that our least-experienced people, the weakest link in the chain, can be accommodated, because my airplane and I have just as much right to come to New York City on business or for pleasure as you professional pilots have to operate your commercial carriers.

"As to positive control, frankly, I don't see how you are ever going to get positive control over everything in the air during VFR conditions. The CAA will be the first to tell you that, because they don't know how they can do it. They can't even communicate with everybody all the time, much less control them. This constant hammering on positive control is wasted effort because the only thing that can result is the end of civil aviation as we know it today. You'll end up with nothing but professional pilots flying through the entire airspace. We have over 93,000 airplanes in the U.S. and the airlines have some 1500 of those. What about all those other airplanes that have just as much

(*Continued on page* 32)

SKYWAYS FOR BUSINESS

News Notes for Pilots, Plane Owners Operating Aircraft in the Interest of Business



AIRCRAFT RADIO MAINTENANCE *at LaGuardia Airport now offers Collins-engineered Integral Flight System test equipment for the calibration and/or repair of IFS units*

Integrated Flight System Test Equipment Now Available at LGA

New York, N.Y. One of the most in-demand equipments being installed in both business and airline aircraft is the Collins Integrated Flight System. Pilots flying the IFS, therefore, will welcome the news that there is now available at LaGuardia Field, personnel schooled on the complete Integrated Flight System at Collins Radio Company's plant at Cedar Rapids, Iowa, plus a complete laboratory-engineered test console for testing the IFS equipment. This test gear also is essential in calibration and/or repair of the IFS.

Aircraft Radio Maintenance at LGA is the first CAA Repair Station of its type to purchase the Collins-engineered IFS test equipment, and also the first to send its personnel to Collins for extensive training in the use of that test gear. Thus, operators of business and airline aircraft are assured a complete and necessary facility at LaGuardia. Aircraft Radio Maintenance also maintains complete facilities for the test and repair of all types of airborne radio and navigational equipment. Aircraft Radio Maintenance is located at the Marine Air Terminal at the west end of the field.

New Gyro-Stabilizer Developed for Business Aircraft by Globe

Dayton, Ohio. An automatic rudder control, under development by Globe Industries, Inc., for several years, is now in production. Called the Gyro-Stabilizer, it functions in a manner of an autopilot to keep an airplane in essentially straight flight or in a controlled stable turn. Designed primarily for business aircraft, the Gyro-Stabilizer has been approved by the Civil Aeronautics Administration for the Cessna 170 series aircraft and approval tests presently are underway for the Cessna 180 and Piper *Tri-Pacer* aircraft. Other approvals are planned for the near future.

List price of the Gyro-Stabilizer, installation parts and templates is reported by Globe Industries to be $595, and the equipment can be installed with ordinary shop tools by any certificated aircraft mechanic in 8 to 10 hours.

Cleveland Aero Products Sets Up New Landing Gear Service

Cleveland, Ohio. A new special service department for the repair and rebuilding of landing gear has been set up by Cleveland Aero Products, Inc. The company is a CAA-approved repair station and now offers complete service including dismantling, inspection, testing and rebuilding in accordance with manufacturing standards. A special service exchange plan also is provided for most popular types of landing gear. This plan offers a completely rebuilt landing gear to the customer who, in turn, sends his dismantled gear back to the company. Cleveland Aero's new service has been designed to reduce the time a plane is out of service for landing gear work. Bailey Wright has been named to head up the new department.

Bell Establishes Subsidiary to Prove Copter Use in Survey Work

Fort Worth, Texas. A subsidiary to pioneer and prove the use of its utility helicopter as a multi-purpose vehicle for uranium exploration and survey work has been established by Bell Aircraft Corporation's helicopter division. Called the Bell Exploration and Development Corporation, the new subsidiary operates a standard Model 47G copter which currently is touring the mineral-rich regions of the southwest. The 47G is equipped with a variety

BELL 47G *is being operated by Bell Exploration and Development Corporation to pioneer use of copter in survey work. Scintillometer recording device is in the cockpit*

of prospecting and mining devices, among them a sensitive scintillation counter and recording instrument located in the 47G's bubble-nose cabin where it can be operated easily. The scintillometer counts and records the number of gamma rays radiating from the earth's surface. The copter also carries a portable diamond core drill which is capable of sinking a hole 300 feet deep. It is used for obtaining core samples.

Harvey Gaylord, vice president in charge of Bell's helicopter division, is president of the new subsidiary; Arthur L. Fornoff is general manager. Offices are also maintained at Glendale, California.

Business Plane Owners Order DME Despite TACAN Controversy

New York, N.Y. Despite the TACAN *vs.* DME controversy and the presently clouded future of Distance Measuring Equipment, the owners and operators of business aircraft are going ahead with installation of DME in their aircraft. Holley Carburetor Company of Van Dyke, Michigan has had a NARCO DME installed in its DC-3 by Associated Radio Co., of Dallas, and the Wyandotte Chemical Company, Wyandotte, Michigan also had gone ahead with a DME for its *Lodestar*. Merritt Chapman and Scott Corp., of New York, had Atlantic Aviation at Teterboro, N.J. install DME in their Beech E18S, and the Sinclair Refining Co., Tulsa had DME put in their *Lodestar* by Aeronautical Radio, Tulsa. This is the tenth Sinclair aircraft to get DME. Standard Oil of California had a NARCO DME installed in their Convair 240 by Bayaire Avionics, Inc., and Champion Paper and Fibre Company had Mathews Electronics at San Antonio install a DME in the Beech D18S based at Pasadena. Mathews also installed a DME in the Hughes Tool Company DC-3.

At the moment, builders of DME have suspended deliveries of equipment, but the feeling throughout the industry seems to be that, despite the controversey, Congress will approve CAA's budget request to continue DME.

U.S. Border Patrol Gets New Cessna 180 for Law Enforcement

Wichita, Kan. The U.S. Border Patrol recently took delivery of a Cessna 180 with an audio amplifier and speaker built into its baggage compartment. Now, by a flip of the switch, the pilot can be heard distinctly from as high as 3,000 feet.

Officials for the Immigration and Naturalization Services have reported that the effect of the human voice is a powerful ally for law enforcement. The pilot can immediately alert his agents, who are below on horses or in jeeps, by using loudspeaker and talking directly to anyone else on the ground concerning any illegal traffic he spots from the air. Before this amplifier and speaker equipment was mounted in the baggage compartment, it was installed on the outside which altered the configuration of the airplane and caused unnecessary drag when in flight. The new installation eliminates that and reports have indicated no appreciable amount of volume has been lost due to the inside mounting.

. . . . in the business hangar

The Philadelphia Evening Bulletin's *Lodestar* is in the Reading Aviation Service hangar at Reading, Pa., for 100 hour inspection and minor radio repairs. Kurt Hellbroun and George Brown brought the plane to Reading.

First Colonial Investment Corporation's Twin Beech has been at Dallas Avionics for installation of new radio equipment, including dual VOR, dual VHF, ADF, ILS and a new custom radio and instrument panel. Dallas is home base for the investment company's Beech.

Northern Natural Gas Co., Omaha, Neb., has equipped its C-50 Beech with a Flite-Tronics MB-3 marker beacon receiver. Minnesota Airmotive made the installation. Northern Natural Gas is a member of NBAA, and J. T. Innis, Vice president-operations, is the company's NBAA representative.

Fruehauf Trailer's *Mallard* is back in operation following installation of a Bendix ADF, and ARC R-11A range receiver and a new remote control panel. Work was done by Airmar Radio Service at MacArthur Airport, N.Y. Bob Kusse is Fruehauf's chief pilot and NBAA representative.

Art Stewart brought Columbia Gas System's *Lodestar* to Remmert-Werner for installation of a Bendix RDR Airborne radar system.

The Aero *Commander* 560 owned by W. B. Osborn, Jr., San Antonio, has been equipped with a Flite-Tronics CA-1 audio amplifier. Installation was made by Airnews, Inc., of San Antonio.

National Automotive Fibres' DC-3 is in the hangar at Grand Central Aircraft for a heater installation, control surfaces recovering and miscellaneous repairs. Traffic manager Allen H. Rhodes is NAF's NBAA representative.

Ed Manning, chief pilot of Inland Container Corporation, has had his new Super 18 Twin Beech in the hanger at Roscoe Turner Aeronautical, Indianapolis, for installation of a new type custom radio control panel and new electronic equipment. A Lear L-2 autopilot with approach coupler and altitude controller has been installed, as well as two Bendix ARN-7 receivers, Wilcox 440 transceiver, an ARC T11B transceiver, two ARC 15D Omnis, two R89B glideslope receivers and a Flite-Tronics receiver.

Dick Notebaert and Jim Godette flew the National Gypsum Company's *Lodestar* to L. B. Smith Aircraft at Miami, to check on the progress of their company's DC-3, presently in conversion at LBS.

Red Devil Tool's newly acquired Twin Beech is in operation after the installation of an L-2 autopilot and approach coupler, and a Wilcox CAT. Reading Aviation Service made the installation. Howard Dubanowich is Red Devil Tool's chief pilot; John L. Lee is the NBAA representative.

Continental Oil Company's business DC-3 boasts a new radio installation done by Dallas Avionics. It includes dual VOR, ADF, VHF, ILS, gyrosyn compass and custom overhead and glare shield panels. Continental is a member of the National Business Aircraft Association.

The *Mallard* belonging to Fuller Brush Company is back flying the skyways after installation of an ARC Type 15D Omni with new ARC combination course selector and deviation indicator, and an ARC R-11A range receiver. Gene Parritt is Fuller's chief pilot, and Joe Burns is Fuller's NBAA representative. Work on the *Mallard* was done by Airmar Radio Service.

The Ford Motor Car Company of Canada has a new Remmert-Werner Super-92 DC-3. Equipment includes Bendix VHF communications, dual Bendix Omni. ADF, RMI and Bendix marker, dual ILS, Sperry C-2 gyrosyn compass and H-5 horizon. Pilots are Jack Clark and David Griffin.

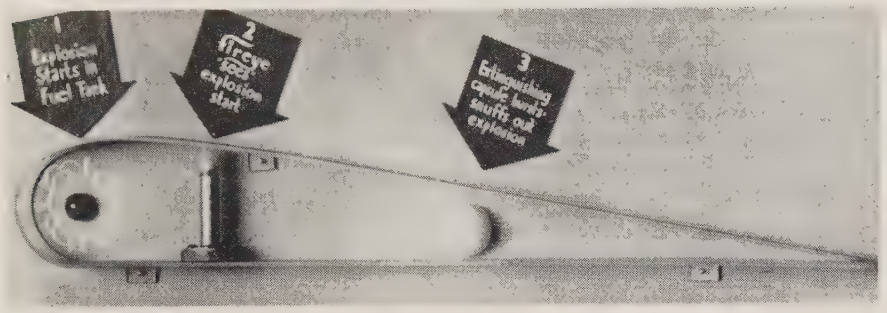
Grand Central Aircraft is readying a Douglas B-26 for delivery to the On-Mark Engineering Co. The airplane is scheduled to go to W. R. Baillard, Ventura, Calif.

Col. Marcilio Gibson, owner and general manager of *Loide Aereo Nacional* of Rio de Janeiro, has been a guest at Aerodex in Miami. Col. Gibson and his airline's chief of materiel, Sr. M. G. Borges inspected the Aerodex facilities.

Captains George Chatham and Dusty Miller, and Assistant Superintendent of Maintenance Al Morrison of Union Carbide and Carbon Corp., have been at L. B. Smith Aircraft checking on the conversion work being done on their company's DC-3. The men flew down to Miami in Union's Convair.

FUELS-OILS

Features and Facts Pertinent to Successful Flight Operations



FIREYE *explosion suppressor for fuel systems responds at about 1/10,000ths of a second. When triggered, the extinguishing agent is spread at a rate of about 300 feet per second*

Fuel Fires Fought By Electronic Unit

Fire and explosions in both ground and airplane fuel tanks may be less a flight operations nightmare henceforth, thanks to a new electronic device that has been perfected by the Fireye Division of the Electronics Corp. of America.

Developed primarily as an explosion suppressor for military aircraft fuel systems, the new device already is being considered for application to ground storage tanks, pumping stations, and other operations areas.

The basic component of the device is a tiny, lightweight infra-red-sensitive photoconductive cell developed by the Electronics Corp. With this cell is a small plastic container holding fire extinguishing fluid. This container also holds a small detonating charge, similar to the familiar dynamite cap.

Together, these components have a weight of about three-quarters of a pound and are small enough to be held easily in the palm of a man's hand.

Military installations, so far, call for placing one of the units (cell, extinguishing fluid, cap) in each fuel tank. Extra containers of the extinguishing fluid are added depending upon the capacity of the fuel tank. Two cubic centimeters of the fire extinguishing fluid can protect a gallon of space in the fuel tank.

The system works like this: Infra-red radiation is emitted in large quantities by any fire or explosion. The photoconductive cell picks up these radiations. When it does, the detonator is triggered immediately. Its blast, in turn, spreads the fire extinguishing agent throughout the fuel tank—at a rate of about 300 feet per second!

In a combat situation, the detector is so sensitive and the triggering system so nearly instantaneous that an incendiary bullet traveling 3,000 feet per second would get only half way through a wing before the extinguishing fluid were hurtled out into the fuel to stop explosion and fire.

After the extinguishing fluid has done its work, of course, it must not interfere with engine consumption of the fuel. Fireye Division technicians claim that it does not. Its effect on the fuel, they say, is negligible. The capsules holding the fluid also are especially designed so as to not hamper fuel use—the pieces into which they are shattered are said to be too large to clog fuel lines.

An idea of the time element involved in this new system is gained by data on the project which led to the present unit. Prior to its development, Republic Aviation had been testing a pressure-sensitive device that could operate within 5/1,000ths of a second. Working with Fireye Division engineers, Republic soon was convinced and could prove that this was far too slow for such explosions as those caused by incendiary bullets. The present speed-of-light principle behind the Fireye device was the subsequent answer.

With new jet type fuels, the JP's and kerosene, fire and explosion hazards may be even more acute. For one thing the vapor mixture in jet tanks is explosive under almost all operating conditions.

Aircraft fuel systems subjected to explosive action can build up pressures of 125 pounds per square inch, enough to tear off a wing.

When the explosive action comes from a low energy source, like a hot wire, this tearing pressure may be reached within 100/1,000ths of a second. High energy ignition, like a bullet, however, can trigger the explosive pressure within 2/1,000ths of a second. The Fireye unit responds at about 1/10,000th of a second!

Along with this new superspeed explosion stopper, and using a modification of its parts, Fireye Division also has developed a unique fire warning device. Although it is also sensitive to infra-red—rather than to smoke or heat as are most other fire detectors—the Fireye device is tuned to frequencies of radiation always associated with fire but not to those frequencies that might represent the radiation of, say, an incandescent lamp or the sun. It is, its makers claim, thus selective and not given to false alarms, although it is geared to never miss a real flame.

Inside a fuel tank, of course, such discrimination is not needed, as there is no ambient infra-red radiation other than that which takes place during fire or explosion. The selective unit, like the speed-of-light unit for inside-tank use, can use the same sort of detonating extinguisher set-up. It is most suitable for areas external to fuel tanks themselves.

The extent to which the units already are being used is demonstrated by the installation in one fighter bomber as described by the company. It will have nine of the selective fire entinguishing units and 13 of the explosion extinguishing systems. Control units, also made by Fireye Division, will monitor all areas and each system also will be independent and self appraised. Electronics Corp. is at 720 Beacon St., Boston, Mass.

Turboprop Fuels Open New Air Era

For every commercial airport operation in the land, a new era is passing from the "future" into the "now" stage. It is the twilight of the piston era and the beginning of the turbine-power era. For fueling and lubing, the era has its own special meanings.

Lubes, of course, must meet the hot, tearing demands of turbine rpm's and temperatures. Turbine manufacturers already are putting the strictest limitations on the oils that may be used in their products.

Fuel is in an even broader time of transition. Here it is not merely quality that is changing. Flight operations must tackle whole new breeds of fuel.

Here is how the new fuel story is developing.

Socony Starts

First fueling of turboprop airliners to go into commercial service in this country, is being handled by Socony-Vacuum at New York's International (Idlewild) Airport. The customer is the Trans-Canada Air Lines' *Viscount* run between New York and Montreal.

The fuel for TCA's new turboprop fleet is JP-4, a wide-cut gasoline which, along with aviation kerosene, forms the base of turbofueling operations so far.

Trans-Canada is said to have chosen JP-4, rather than kerosene, because its engineers feel the gasoline-type to be cleaner and to permit easier restarting of turbines in case of a combustion blow-out in flight.

Actually, however, Rolls-Royce, maker of the *Dart* engine that powers the *Viscount*, has given a strong endorsement to the use of kerosene. And, Capital Airlines, which also is putting a *Viscount* fleet into the air, has chosen kerosene as its fuel. Its supply will be from the Shell Oil Co.

For TCA, however, Socony's Flying Red Horse pumps will supply more than 2,500,000 gallons of JP-4 this year and more than

3,000,000 a year in the two succeeding years, according to Wilbur S. Mount, manager of Socony-Vacuum's Aviation Dept.

In the *Viscount* fueling operation, the loading port is located in an engine nacelle. It is an upward fueling situation, rather than the familiar pour-down of other planes. Hose connections are at an upward angle in the bottom hemisphere of the nacelle. It is a pressurized system. Socony's set-up uses a 50 pounds per square inch pressure and feeds up to 75 gallons per minute. The *Viscounts* can handle 2,000 Imperial gallons. That measurement system, being standard for TCA, of course, has meant that Socony, at its New York installation and at its planned alternate *Viscount* fueling base at Buffalo, N.Y. has had to shift its meter readings from the American to the Canadian measurement.

Significance And Forecast

In broader terms, the turbine fueling era seems to be opening up like this:

In the first place, fuel engineers are far from totally satisfied with the several turbine and jet fuels now available.

One immediate problem in these fuels so far is that they tend to retain water in suspension appreciably longer than high octane avgas. This problem is most acute with kerosene, and could demand installation of separate settling tanks to avoid loading with overly moist fuels.

As research continues on other fuels, to minimize that and other problems, the International Air Transport Association is working on turbine fuel specs that would meet these demands: 1. Available in needed quantities wherever wanted; 2. Hazardous to no greater degree than gasoline; 3. Maximum heat output per unit; 4. High engine-preservation qualities; 5. Low cost.

One thing is sure in all the turbine and jet fuel discussions, however. The oil industry will be able to handle all foreseeable fuel demands without any appreciable strain on its facilities. Estimates as to future jet fuel demands run up to some 100,000 barrels per day by 1965. This would be only about *a third of one percent* of this country's over-all demand for petroleum products.

How will this affect the supply of regular high octane avgas? The demand will decrease, many oilmen say, but not seriously —despite the steady transition to turboprops for top routes. Small piston planes, too, will remain as a solid demand field for normal fuels. Aircoach competition may continue to center around piston craft.

On the ground, of course, there will be other changes to meet the new demands of the new turbines. Socony's pressurized, nozzle-up system is an example already. Shell, for its forthcoming kerosene fueling of Capital's *Viscounts* is planning perhaps even more extensive installation of new ground facilities. Settling tanks may be a big item.

For fuel manufacturers, there is one strong advantage in this transition period. Unlike avgas, both JP-4 and kerosene fuels can be turned out by practically any refining facility capable of producing straight motor gasoline and heating oil. That fact, however, is far from meaning that refining of the jet-type fuels is a mere "snap." In the negotiating for the Capital contracts, for instance, there were hurdles aplenty for the bidders, beyond the price.

TURBOPROP *fuel is pumped into Trans-Canada's Viscount tanks by Socony-Vacuum at New York Int'l Airport. Canadian airline Viscounts use JP-4; Capital will use kerosene*

A freeze point of 40° for the kerosene forced some brands out of the race. A viscosity spec of 6 centistokes maximum at zero F. got others. The ASTM distillation demands also proved too much for some. They came out to 20% minimum evaporation at 392° F., a maximum final boiling point at 572° F., a 2% maximum residue, and maximum distillation loss of 1.5%.

Eight companies were reported in on the bidding for the Capital business, with five of them in the final stretch with the ultimately successful Shell Oil Co.

From a fuel operation point of view, it has been indicated that Capital figures that although the *Viscount* gobbles about 400 gallons per hour, roughly the same as a *Constellation*, its actual operating costs will be below that of even a DC-4 with only 250 gallons per hour consumption. The difference in fuel cost is, of course, part of that picture. Aviation kerosene brings about 12 cents per gallon (although the Shell-Capital contract price has not been mentioned). Hundred octane avgas is about 17 cents per gallon, delivered into customer storage.

Fuel System Tests Are New Douglas Goal

Fuel systems, the heart of an aircraft, have been taken out of the "in flight" testing category by a new $750,000 installation at the Douglas Aircraft plant in Long Beach, Cal. Object of the new testing center will be to thoroughly test fuel systems at a ground-level station before utilizing the systems in flight. Accidental malfunctions, thus, can be observed and solved safely without the risks, expense and limitations of actual flight conditions.

An idea of the new efficiency which the fuel testing center introduces has been given by Douglas in the case of the fueling system for the RB-66. During a single working day, the company says, the performance of a fuel or any part of the RB-66 fueling system may be conducted under conditions ranging from +130° to —85° F., and from sea level up to altitudes of more than 80,000 feet. Duplication of that schedule during one day aloft would not be possible.

Also, the new fuel-systems testing center can "build-in" safety margins that flight testing could not tolerate. An example would be heavier wall tanks, more extensive fire equipment, etc.

Too, the new ground-level testing facility will duplicate conditions which ordinarily would require test movement over thousands of miles, from arctic to tropical conditions.

Fuel for the tests at the new center will be stored and then heated or cooled in the test area, but at a safe distance.

The test unit itself is in the form of a large jig that is pivoted on a fulcrum. Installed in the unit, the fuel system can be placed in all flight attitudes, nose-up, nose-down, and in bank positions. Fuels to be tested then can be introduced into the system under controlled temperature and pressure variations and the functioning studied more closely and exactly than in actual flight.

Too, the new facility can simulate both aerial and ground fueling operations. Its capacity is described as equal to that of 1400 ordinary automobile service stations. Air can be pumped into or exhausted from the test chamber at the rate of 130,000 cubic feet per hour.

Scheduled for a tryout in the test facility is the fuel system of the new C-133 transport now being built by Douglas for the USAF. MacIsaac and Menke Co., general contractors, of Los Angeles, handled the project for Douglas, while Moffatt and Nichol, Inc., turned in the design engineering.

Shell Oil Secretary Named Vice President of the Shell Oil Development Company

Jack A. Horner, secretary of the Shell Oil Company, recently was appointed vice president of the Shell Oil Development Company, in charge of its licensing division. Mr. Horner also will continue as secretary of the parent company.

Mr. Horner joined Shell Oil in 1943, became assistant secretary, and was then named secretary in April, 1953.

ENTER NOW! THE MOST EXCITING CONTEST IN HISTORY

TO CELEBRATE 30 YEARS OF AIRLINE SERVICE!

TWA's $100,000 COSMIC CONTEST

$50,000 NOW... $50,000 IN 1985

It's easy! It's fun! It's actually two contests in one. You can enter one or both parts . . . win both first prizes for a grand total of $80,000. And you can start right away because the entry blank to Part 1 is on the opposite page!

There's never been such a contest before! Just think what you could do with one of the big cash awards! Why you could pay off the mortgage, send the children to college, and still have plenty of money left over for travel to all those enchanting lands you've always dreamed of seeing some day. What's more, you may even win the big $50,000 cash prize in 1985 by entering Part 2 of TWA's Cosmic Contest!

So get busy this minute. Think of all the wonderful things you like about traveling by airplane, and why TWA is the way to fly. Read the tips on how to win both parts of this exciting contest printed on this page. Then fill in the official entry blank for Part 1 in this advertisement and mail it promptly. In a few days, you'll receive your official entry blank for Part 2, and another chance to win even more money!

30 CHANCES TO WIN RIGHT NOW!

1st PRIZE	$30,000
2nd PRIZE	5,000
3rd & 4th PRIZES	2,000
5th through 10th PRIZES	1,000
11th through 30th PRIZES	250
	$50,000

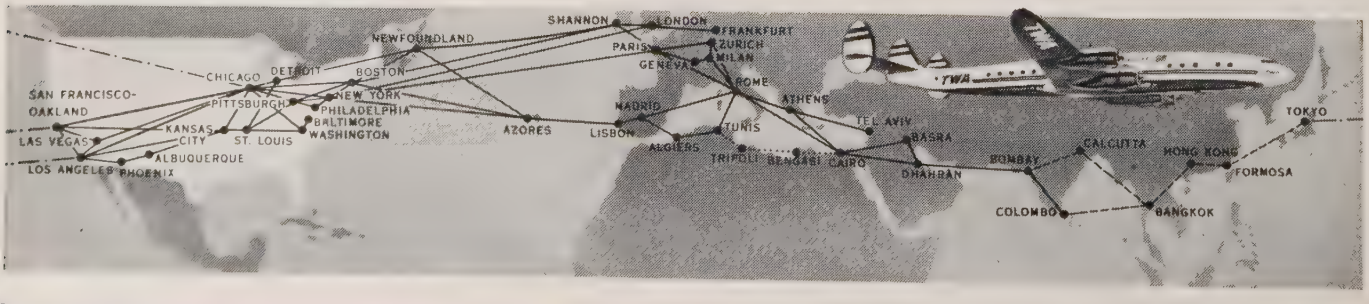
Here's all you do. Just complete the following statement in 30 additional words or less: "Flying is the way to travel, and TWA is the way to fly because_____."

Winners will be announced on or before September 30, 1955!

$50,000 IN CASH!

To be awarded 30 years from now in 1985!

Here's how to enter Part 2 of TWA's Cosmic Contest. When you send us your entry for Part 1, we will send you a special entry for Part 2. On this form write in 200 words or less what you think commercial air travel will be like thirty years from now! Your entry will be microfilmed and sealed in a special vault at TWA's new maintenance base in Kansas City, Mo. Then, in 1985, a selected board of judges will examine the entries and pick the winner.



TIPS ON HOW TO WIN PART 1

Simply think of all the many reasons why you'd like to travel by world-proved TWA. You'll find it easy to list advantages, such as speed, comfort, dependability, convenience, ideal schedules, world-wide routes. And to help you, here are just a few things you might say about TWA's many contributions to air travel:

TWA has put a two-week vacation in Europe within reach of millions more Americans by pioneering low-cost Sky Tourist service and developing a simple "Time Payment Plan" for travel anywhere.

Through its active support of the American creed of free enterprise and competition, more people than ever are now able to enjoy all the advantages of air travel.

TWA's voluntary assistance to countries of the free world in helping to organize their own efficient airlines has helped promote friendship between the U. S. and other nations.

TWA's swift, dependable service between 80 key cities on 4 continents has stimulated world trade and friendship.

TWA's leadership in efficient, economical operation has shown the way toward elimination of costly government subsidies with great savings to taxpayers.

TWA's leadership in mechanical and technical advances, its great fleet of Constellation aircraft and its skilled, courteous personnel have set new standards of speed, comfort and dependability in air travel.

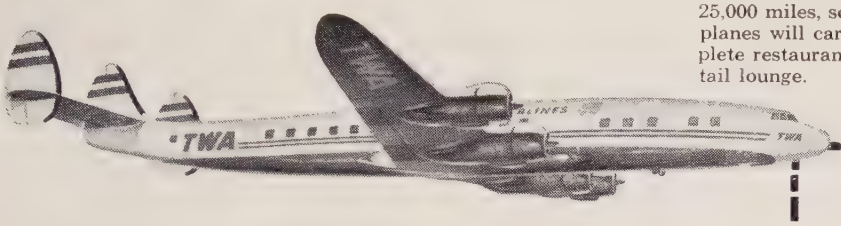
TIPS ON HOW TO WIN PART 2

Here's what some people think air travel will be like in 1985!

It's so much fun to imagine what flying will be like in 1985. Just read these answers. See how easy it is to predict things to come. Then write your own predictions on the official entry blank TWA will send you when your entry to Part 1 is received.

For example, a housewife may write: "In 1985, I think aviation will be like this: It will be possible to fly all the way from Los Angeles to London without stopping. It will take just 6 hours, and you'll fly in an airplane that looks like a flying saucer, with no wings or tail and a huge cabin that is divided into many private staterooms. There will be no runways at airports because these planes will take off straight up and land like helicopters. The average speed of these planes will be about 1000 miles an hour. They'll fly about 30 miles up in the stratosphere. These planes will use atomic power that will last indefinitely, and their engines will be made of materials that last for years and years without attention."

A businessman might say: "In 1985, I think commercial aviation will be like this: Planes will be powered by rockets using a new type of fuel. They will fly at altitudes of 50 to 100 miles above the earth at a speed of 2000 miles per hour. Because of this speed, special watches will be designed so passengers can keep up with the rapid change in time zones. These space planes will take off straight up in the air. They will land the same way, using a special device that counteracts the gravity pull of the earth. They will have a range of 25,000 miles, so they can fly non-stop anywhere in the world. These planes will carry as many as 500 passengers and will feature complete restaurant service, a movie theatre, soda fountain and a cocktail lounge.



OFFICIAL RULES FOR
TWA's COSMIC CONTEST

1. TWA's Cosmic Contest consists of two parts. You may enter either one or both parts. Entries for both parts of the contest must be postmarked on or before July 31, 1955, and received not later than August 31, 1955. To enter Part 1, simply complete this statement in 30 additional words or less, "Flying is the way to travel, and TWA is the way to fly because . . ." To enter Part 2, state in 200 words or less what you think commercial air travel will be like thirty years from now (1985). A sketch of the type of aircraft used then may also be submitted, but the complete entry must be held to space provided in the official entry blank.

2. You may submit as many entries as you wish, but in each case an official entry blank must be used. An official entry blank for Part 1 is printed in this advertisement. Entry blanks for Part 2 will be mailed to you when your entry to Part 1 is received. Additional entry blanks for both Part 1 and Part 2 may be obtained at TWA ticket offices, on board TWA planes and in most authorized travel agencies; or by writing to TWA, P. O. Box 85, N. Y. 46, N. Y.

3. Contest is open to everyone except employees of Advertising Distributors of America, Inc., TWA or its advertising agencies and members of their immediate households and families.

4. Prizes listed on entry blank and in this advertisement will be awarded on the basis of sincerity, aptness and originality. Literary skill is of secondary importance. Neatness will count. Entries to Part I will be judged by Advertising Distributors of America, Inc. Winners will be announced on or before September 30, 1955, and names of winners may be obtained by written request to the address above, enclosing a stamped, self-addressed envelope. Entries to Part 2 will be microfilmed and stored in a vault in Kansas City, Mo. The chief executive officer of TWA will name the independent judges of Part 2 on or before January 1, 1985, and the winner will be announced before July 1, 1985. In the event the contestant submitting the winning entry to Part 2 is not living on the date the winning entry is announced, the prize money to Part 2 will be paid to the person authorized by the last will and testament of that contestant or otherwise authorized in law to receive such payment, or to the legal representative of the estate of that contestant. Judges' decisions are final; duplicate prizes in case of ties.

5. Entries must be the original work of contestants and submitted in their own names. All members of a family may enter, but only one prize for Part 1 will be awarded to a family. Contest is subject to all governmental regulations and causes and conditions beyond TWA's control. All entries become the property of TWA, and submission of entries to one or both parts of the contest gives TWA full rights to reproduce, publish and use such entries as TWA sees fit at any time.

TWA
TRANS WORLD AIRLINES
30 YEARS OF Service
1955
U.S.A. · EUROPE · AFRICA · ASIA

Fly the finest . . . **FLY TWA**
TRANS WORLD AIRLINES
U.S.A. · EUROPE · AFRICA · ASIA

OFFICIAL ENTRY BLANK PART 1

TWA's COSMIC CONTEST

$50,000 IN CASH AWARDS NOW!

TWA's Cosmic Contest
P. O. Box 85
New York 46, N. Y., U. S. A.

Dear Sirs: Here is my completed entry blank for Part 1 of TWA's Cosmic Contest. I understand you will send me an official entry blank for Part 2 when you receive this entry.

Flying is the way to travel, and TWA is the way to fly because:

(Complete in 30 additional words or less)

_____

_____

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_____

Name _____

Address _____

City _____ *State* _____

Country _____

Official NBAA Report

NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC.

(formerly Corporation Aircraft Owners Association)

National Business Aircraft Association, Inc. is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable business aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. NBAA National Headquarters are located at 1701 K Street, N. W. Suite 204, Washington 6, D.C. Phone: National 8-0804.

NBAA Adopts Revised By-Laws in Program of Decentralization

At a special meeting of its membership in Washington, D.C. on March 28, the National Business Aircraft Association, Inc., adopted revised By-Laws which extensively revamped its organizational structure.

In describing the action taken at the meeting, Association President, Henry W. Boggess said: "The adoption of our new By-Laws is a first step in a planned program of decentralization and expansion of NBAA. It permits official representation at local, state and regional levels as well as encouraging the participation of top industrial executives on a policy-making level."

Mr. Boggess also pointed out that the rapid growth of business flying dictated the reorganization of the Association. "Our Board of Directors", he added, "has adopted a long-range plan designed to serve the interests of all business aircraft owners, both large and small, from local hangars to the halls of Washington."

Under the reorganization plan, the Association set up the offices of President with one or more national and regional vice presidents. After the meeting, Mr. Boggess, Director of Aviation for Sinclair Refining Company, Tulsa, Oklahoma, was elected President by the NBAA Board of Directors. Ralph Piper, Chief Pilot, Monsanto Chemical Co., St. Louis, Mo., became national Vice President.

Appointment of other vice presidents, representing various sections of the country, will be announced at a future date.

NBAA Names Curt G. Talbot Technical Committee Chairman

Curt G. Talbot, Manager, Flight Test Center, of NBAA-member General Electric Co., Schenectady, New York, has been appointed Technical Committee Chairman of the National Business Aircraft Association.

In making the announcement, Henry W. Boggess, NBAA President said, "Mr. Talbot is highly qualified both from a piloting and technical standpoint to fill this important post."

As Chairman of the Technical Committee, Talbot will monitor developments in air navigation, electronics, airports, weather, maintenance techniques, business-aircraft operations, safety education, and submit periodic reports to the Association membership.

Talbot succeeds Ralph E. Piper, Chief Pilot, Monsanto Chemical Co., St. Louis, Mo., who has held the post for the past two years.

A native of Plymouth, Illinois, Talbot graduated from the University of Illinois in 1936 where he received his BSEE degree. He started flying in 1936 and presently holds a CAA Commercial Certificate with single- and multi-engine ratings, commercial helicopter and instructor ratings.

Immediately after his graduation, Talbot went to work for General Electric and was advanced to his present office in 1945.

Talbot is a member of a number of technical societies and pilot organizations, including the Society of Automotive Engineers, American Institute of Electrical Engineers, and Quiet Birdmen.

ACC Assigns VOR/DME-TACAN Controversy to NAV Panel

The top Air Coordinating Committee, composed of cabinet-level members from civil-military government agencies, has assigned to the ACC NAV Panel the task of resolving the VOR/DME-TACAN dispute with instructions that policy recommendations be submitted no later than April 15. The meeting will have full military and civil agency attendance, with industry and agency advisory groups represented at as many meetings as possible.

Referral of the issue to the NAV Panel possibly is the first real break in the long deadlock which had promised to become more complex and increasingly difficult of solution. Since the NAV Panel has been responsible for resolving situations of this type in the past, a "great deal of effort and bitter disagreement" might have been averted if this move had occurred before the ANDB announcement of its pro-TACAN decision.

Predicated on present trends, it is predicted that the end-product will be a recommendation from the NAV Panel that DME be continued and further implemented until TACAN (if it eventually proves operationally workable and compatible) or any alternate system is developed and is ready to replace it.

ACC's sudden decision to pass the job to the NAV Panel undoubtedly was accelerated by State Department and Civil Aeronautics Board letters submitted at the March 11 ACC meeting. State went on record that any attempt to standardize on the military TACAN as the short-range component of the Common System would have "serious international implications." State also requested an ACC policy decision on the ANDB pro-TACAN report. State would be "very reluctant," said Samuel S. Waugh, Assistant Secretary of State, "to approach ICAO or any foreign governments with a proposal to substitute TACAN for DME unless the U.S. Government agencies concerned are convinced that any undesirable features of the adoption of TACAN are outweighed by its possible advantages, and that present policy adopted in ACC is accordingly amended in ACC." The CAB Chairman, Ross Rizley, in a letter to the ACC Chairman stated that "The Board is concerned over the proposed plan of action since the Air Navigation Development Board's announcement has been misinterpreted as being official U. S. policy and has and will continue to have an adverse effect on domestic and international aviation until such time as U. S. policy is clarified." Rizley also questioned the effect the ANDB report would have on aviation safety, domestic economy, the CAA common system implementation program, equipment manufacturers, international commitments, and so on. He urged the ACC to formulate a coordinated government policy on the Common System.

As a member of the NAV Panel, NBAA has attended several sessions in the past week. Attempts were made to develop questions to be considered and policy areas to be covered. *NBAA is continuing its firm stand taken on the VORTAC Committee and since that time to protect the interests of its members.*

The Senate Interstate and Foreign Commerce Committee recently approved without dissent the proposal to investigate the VOR/DME-TACAN dispute. Sponsored by Sen. Styles Bridges (R-N.H.), the resolution (S. Con. Res. 16) was amended to increase joint committee membership from 12 to 16, adding two members each from the Senate Foreign Relations and House Foreign Affairs committees. The commerce committee also provided for an interim report to be filed by June 30 of this year and advanced the date for a final report to Dec. 31, 1955.

The committee was strongly impressed with the argument that neither a single committee or executive agency possessed sufficient jurisdiction to make or implement a decision on a civil-military common-use air-navigation system. The 80th Congress' Joint Congressional Aviation Policy Board, which recommended the present common-use system, was cited as a precedent.

The international implications of the controversy, as expressed by the State Department, previously mentioned above, persuaded the committee to add members from the House and Senate Foreign Relations committees. Thus, the joint committee's

make-up would include members representing committees dealing with all aspects of aviation—civil, military, foreign—as well as appropriations, research, manufacture and installation of navigation systems.

Spokesmen for the Commerce Committee said the June 30 interim report stipulation was designed to provide appropriations committees with adequate information on the dispute in time for them to appropriate funds for fiscal 1956 activity.

The Bridges Resolution now goes to the Senate floor and, if passed, will be sent to the House where it no doubt will be referred to the House Commerce Committee, Both branches will then have to appropriate funds to operate the joint committee. The sum requested by the resolution is $125,000.

In brief, the resolution directs the joint committee to: "(A) study thoroughly all aspects of the common system of air navigation in the United States and the use in that system of navigation facilities." The committee would be required to report its findings and conclusions and submit its recommendations to the Congress.

The Vice President and the Speaker of the House would appoint the members of the joint committee—eight from each house, representing the committees on Appropriations, Armed Services, Foreign Affairs and Foreign Relations, and Interstate and Foreign Commerce.

As this "NBAA Report" goes to press, the Senate has passed the Bridges Resolution and referred it to the House of Representatives. Its early passage is expected.

USWB Chief Requests Pilot Reports of Enroute Weather

Just what can you, the business pilot, get in the way of flying-weather forecasting from the Weather Bureau? Flying weather is manifested in many varied and complex forms. In a widespread weather disturbance you have noted the extreme variations in clouds, visibility and weather over short distances and in relatively short time. It is usually possible to make satisfactory forecasts for periods of 12 to 24 hours in advance. For shorter periods, forecasters have about 85% success in forecasting the lower ranges of cloud heights and visibility. A period longer than the 12- to 24-hour period becomes an *outlook*, as forecasters cannot be as specific that far in advance and his predictions are representative of his best views of probable conditions. In general, these are the facts about flying-weather forecasting, as outlined by the Weather Bureau: (1) The forecaster *can* usually do a good job of forecasting ceilings and visibilities up to about 12 hours in advance. He usually *cannot* tell you with much confidence what kind of flying weather to expect for several days in advance. (2) The forecaster *can* give you a general outlook of flying-weather conditions for one or two days in advance. He *cannot* make satisfactory flying-weather forecasts for longer periods. (3) The forecaster *can* do a good job of telling you some hours in advance when, and the general area where, thunderstorms will likely occur. He *cannot* tell you exactly where thunderstorms will be, the exact time they will occur, or precisely forecast their intensity. (4) The forecasters *can* often give you an "out"—an alternate course of action to take in case the weather turns out worse than expected. He *cannot* do this, however, when the weather is doubtful in all areas. (5) The forecaster *can* often tell some hours in advance when conditions are favorable for tornadoes and the general areas in which they may be expected. He *cannot* tell you precisely when and where a tornado will occur. (6) The forecaster *can* and is anxious to help pilots with their problems. He *cannot* make the decision "to fly" or "not to fly" for the pilot.

In helping the forecaster, the Chief of the U. S. Weather Bureau is requesting pilots to advise on enroute weather conditions. So, if you've had to dodge some thunderstorms or otherwise observed weather disturbances, advise the nearest CAA communications.

SAC's Connell Warns of Damaging Action of Sand

A timely seasonal tip to business pilots to beware of damaging abrasive action to engines and aircraft engaged in spring and summer "sandstorm flying" has been issued by W. J. Connell, Superintendent of the aircraft overhaul division of NBAA member Southwest Airmotive Company, Dallas.

Each year, an average of four engine changes are performed by SAC as a result of cylinder and ring damage caused by sand entering through air intakes, Connell revealed. Evidence of such damage usually takes the form of ring oil blow-by visible in the crankcase breather.

He suggests that, after exposure to sand, either on the ground or in flight, oil be changed as quickly as possible, oil screens be checked, and that the engine be washed down and its compression verified. Even a few minutes in a sandstorm often may be sufficient cause for concern, he said.

A World War II Lockheed Overseas Inspector, Connell recalled that aircraft operating in desert areas were equipped with "desert air filters" but that weight and cost factors have obviated their use on peacetime civilian aircraft.

Sand also can rough-up propellers and leading edges should be smoothed down again for top efficiency. He said he has seen several aircraft which, when parked outside during severe blows, looked as if their windward sides had been sandblasted. The owners had them completely painted to cover their "weather-split personalities." Control surface bearings also may be affected, Connell warned.

Frozen Static Vent KO's Airspeed, Rate-of-Climb

C. V. Starr & Co., Inc., New York, one of our members, had a recent experience with a DeHavilland *Dove* which would be most serious under adverse conditions. This possibility, or rather the remedy, was discussed at an NBAA meeting in New York.

Starr's Chief Pilot Nev Watson says: "Briefly, this was the situation. Landing in a fairly heavy snowstorm, we were delayed about two hours awaiting passengers and weather. With the break, the airplane was cleaned of snow and run up, during the run-up both A/S were noticed hung at around 80; pitot heads were checked and found normal and heating. Since the weather had broken, it was decided to give it a go. On take-off we had no *airspeed, rate of climb, or altimeter,* and, brother, that is really confusing even when you are looking for it. At this point, the static vent finally rang a bell, so instead of switching to *alternate source* we landed to check. It was found that during the temperature change snow had melted, running down the side of the fuselage into the static hole. It had then frozen solid as far as ½ inch inside. A little heat from the Zippo and a wire coat hanger soon remedied that situation.

"I have talked with several pilots, CAA, and maintenance men, and none thought of the static vent until it was too late. If this condition existed and the airspeeds were in a reasonably normal position, weather was 300 and 1 with BS, no alternate source available, I believe we'd have had quite a headache, don't you? After a bit of thought another solution would be to bust the glass on one A/S thus creating an alternate source."

New NBAA Members

E. W. Wiggins Airways, Inc.
Norwood, Mass.
NBAA Rep: Clifford J. Fuller, Jr.
Company operates: Piper *Apache,* (3) Piper *TriPacer*

Burns Aero Seat Company, Inc.
Burbank, Calif.
NBAA Rep: Richard A. Dick, Asst. to President.
Company operates: Beech *Bonanza*

Qua'itron, Inc.
Burbank, Calif.
NBAA Rep: John F. Haussler, Jr., President

Federal Telecommunication Laboratories
Nutley, N.J.
NBAA Rep: Brig. Gen. Peter C. Sandretto, Asst. Vice President
Company operates: Douglas DC-3, Boeing B-17.

Seaboard Oil Company
Dallas, Texas
NBAA Rep: N. L. Ledbetter, Jr., Pilot
Company operates: DC-3

Richfield Oil Corporation
Los Angeles, Calif.
NBAA Rep: Norman F. Simmonds, Asst. to President
Company operates: Douglas DC-3, (3) Beech D18S and *Bonanza*

Leonard Refineries, Inc.
Alma, Mich.
NBAA Rep: Robert S. Moore, Chief Pilot
Company operates: Beech D18S, *Bonanza* D-35, *Bonanza* C-35.

O'Connor Aircraft Company
Watervliet, N.Y.
NBAA Rep: Charles P. O'Connor, Jr.
Company operates: Stinson (S), Cessna 195, Beech *Bonanza*

Air Safety Forum

(*Continued from page 11*)

These viewings were followed by a discussion period in which the film presentations were evaluated as a potential means of qualification. The producers requested criticism of their first efforts. Many ideas for increasing the efficiency of the film as a visual aid were given the full discussion treatment.

This is a new use of an old medium. Such familiarization would be of tremendous advantage to the business pilot who may land at more different airports in a month than some airline pilots will in five years. SKYWAYS already has featured an article on this film-aid idea *(January issue)* and will do so again as further developments are recorded.

During the evening of the first day of the meeting, United Airlines' DC-6 and CV-340 Dehmel Trainers were open for the Forum members and guests to inspect and fly. Probably more pilots "crashed" during those three hours than in the previous history of aviation as they indulged in their hidden desires to see if they could "beat the machine" and get away with it. (They couldn't!) Everyone expressed admiration for the realism that was incorporated in the Trainers. Many felt that its ability to demonstrate the need for using proper procedures or paying the consequences would be of as much value to pilots as would the opportunity it affords for perfecting technique in a particular make and model of aircraft.

The second day was devoted to the subject of pilot training and all-weather flying, with the Annual Air Safety Forum Banquet in the evening. Pilot training was analyzed from the viewpoint of the pilots, the operators, the manufacturers, and the CAA. Panel members were Captain L. H. Mouden, BNF; Captain W. W. Moss, Assistant Chief Pilot—Training, PAA; Robert P. Brush, Flight Test Division, Douglas Aircraft Co., and Bob Gates, Flight Operations Specialist, CAA, Washington.

This subject was worked over more than any other agenda item. As is to be expected, this is a vital and controversial subject to all aviation operations personnel. Discussion ranged from the expressed belief that "the best pilot training would be more free time to rest up from flying" to a suggested training program that would utilize an average of almost one day per week of the pilot's time. It was recognized that the type of flying operations involved dictated the need and the type of training program.

International and local-service operations represent the two extremes of flying conditions. One pilot might be exposed to only 10 landings a month on overseas flights. Another, flying for a local-service carrier, might make as many as 15 take-offs and landings during a single trip. The latter could conceivably work more instrument approaches in a single day than the International pilot would in six months.

All-weather flying has been the goal of aviation since the day Jimmy Doolittle demonstrated the practicability of flying without visual reference to the ground or horizon. The needs of all-weather flying —the progress that has been made toward that goal—its ramifications, from an operational viewpoint and upon traffic control—were presented by the panel members. One of the highlights of the sessions was the look into the future "instrument" flying given by LCdr. George W. Hoover, Office of Naval Research. This paper (which was featured in the April issue of SKYWAYS) pointed out that the ultimate goal is to again fly by visual references to the ground and horizon—only bring those inside the cockpit regardless of the weather.

The other panel members were Captain E. A. Cutrell, AAL, Chairman ALPA Runway Lighting Committee; Davis S. Little, Superintendent Airways Aids & Electronics, AAL, and Sam Saint, ANDB, speaking for Colonel J. F. Taylor, Director of Air Navigation Development Board.

Special guests at the Banquet included Frank Entwistle, Chief of Flight Branch, ICAO, Montreal; Captain Peter Bressey, British European Airways, London; Fred B. Lee, Administrator, CAA; W. K. Andrews, Chief, Bureau of Safety Investigation, CAB; David Proudlove, Air Attache, British Embassy, Washington; C. N. Sayen, President, Air Line Pilots Association, and Jerome Lederer, Flight Safety Foundation.

Members of the crew of the UAL CV-340 that made the "impossible" crash landing in Iowa, without serious injury to passengers or crew, were presented awards by Mr. Lederer on behalf of the Flight Safety Foundation. Receiving the awards were Captain E. W. Andreason, First Officer Thomas D. Boyle, and Stewardess Patricia Johnson.

Mr. G. W. Taylor, Boeing Airplane Co., Seattle, was the guest speaker. Mr. Taylor discussed the development of the Boeing 707, which has held the spotlight so much the past year. This was followed by a color movie of the first flights of the prototype 707, the first U. S. jet transport.

"Accident Investigation and Prevention" was the first subject for panel discussion on the final day. The emphasis was placed upon the prevention of accidents and the reduction of injury or loss of life when accidents do occur. Captain J. D. Smith, CAP, New York, pointed out the results potentially obtainable by an effective prevention program as developed from the results of accident investigation. W. K. Andrews, Chief, Bureau of Safety Investigation, CAB, analyzed the accident picture in scheduled passenger operations for the purpose of showing how the investigations attempt to produce evidence of the causes, so they can be eliminated and prevent additional similar accidents. Flight Safety Foundation's ideas relative to an effective accident investigation and prevention program were presented by Jerry Lederer, Director National Flight Safety Foundation. Howard Hasbrook, Associate Director, Crash Injury Research, Aviation Section, Cornell University, recognizes that there probably always will be accidents as long as machines of any kind, and human beings to run them, are in existence.

"Designing for Survival of Crew and Passengers in Survivable Aircraft Accidents" was the title of Mr. Hasbrook's paper, and it was a most effective reminder of the need for designing the component parts of aircraft with a prime emphasis on the protection of passengers.

The last panel included the outstanding personality of the Forum, Peter Bressey, Captain, British European Airways, and representative of IFALPA (International Federation of Air Line Pilots Association). This panel discussed Turbo-Propeller Transport Operations. Captain Henry S. Weigel, Capital Air Lines, presented the viewpoint of a pilot who is first being "exposed" to the problems of turbine-powered operations. This was a timely subject as Capital Air Lines is soon to inaugurate turbine-powered passenger transport service in the United States.

Ray B. Malloy, Chief, Flight Test Branch, CAA, described the problems of certification of a turboprop transport. Mr. Malloy is also conversant with the problems of U.S. certification of foreign aircraft. He is now on his way to Paris to open an aircraft engineering advisory office for the CAA with the purpose of helping foreign manufacturers meet the U.S. certification requirements.

J. T. Ready, Jr., Project Engineer, Convair, outlined Convair views and experiences with the turboprop airplanes. They are the chief contenders for the turboprop transport market among the domestic manufacturers at this time. This was apparent in the discussion of Mr. Ready's paper and of the one presented by Captain Bressey of BEA. Bressey's personality and ready wit, combined with his intimate knowledge of the subject matter, made him the outstanding panel guest of the Forum. With turboprop transports of such keen interest to aviation at this time, everyone wanted to take advantage of Captain Bressey's two years' experience in scheduled operations with the *Viscounts*. The questions were many and varied in spite of his most graphic and comprehensive description of the airplane, powerplants, and operational problems given in his panel paper.

ALPA's Annual Safety Forum is now firmly established. It has gained recognition and acceptance as another of the needed means of promoting aviation safety through an exchange of ideas on "currently critical problems." It now must use its newly gained position to promote and foster an even greater "exchange of experience and knowledge on operational problems among pilots and others." Each transport pilot faces the same basic problems, regardless of whether he is flying a Beechcraft or a DC-3 for some corporation, or a DC-7C in scheduled airline service. Traffic, pilot fatigue, engine failure and weather are no respecters of pilots or planes.

Platinum Plugs

Platinum, the preference for fine jewelry, is now increasing the life of aircraft spark plugs. The AC Spark Plug Div. of GM is making plugs employing a silver center electrode with a platinum tip and platinum side electrodes. For use on bombers and transports, the new plug offers twice the life of the standard massive-electrode plug.

Pilot Training Program

(*Continued from page* 13)

think it calls for emphasis in any pilot training and check program. I also think it calls for some engineering improvement in the provision of better aircraft control at critical speeds. A 160-lb rudder force and full rudder pedal throw are just too much for ease of handling. Not only that but they require perfect adjustment of rudder pedals, seat height and tilt, and seat fore and aft positioning in order to be obtainable. The "black box" referred to before is actually our "Portable Fire and Trouble Warning Simulator" developed by one of our training Flight Engineers, Dick Lee. A DC-6B model of it is illustrated in *Fig. 1*. By connecting this unit into the aircraft's fire-warning system, it is possible to cause fire-warning signals, both bell and proper lights, without the trainee being aware that any such move is being made. If an actual fire should occur, the normal fire-warning system is still operative, and if by some freak of chance an actual fire should occur while a simulated one was being signalled, the proper light on the box glows to show that it is no false alarm.

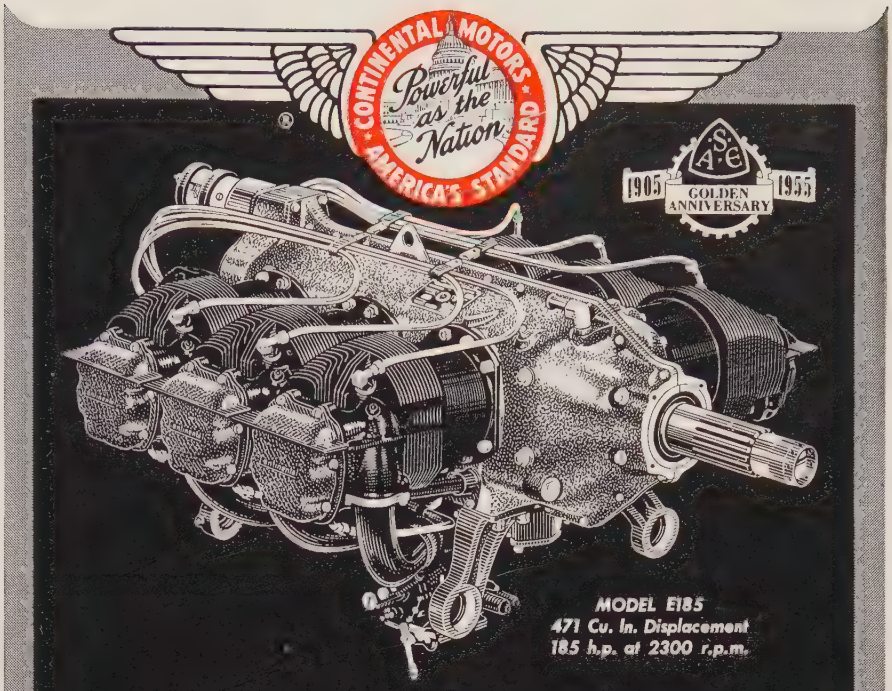
This invention is uncomplicated, contains no tubes and has already been extended to give generator over-heat warnings, which is only one example of its further use. A later model of this simulator permits preselection of the desired trouble, with actuation dependent on a single button. This permits an instructor to initiate the problem at the desired moment without having to take his eyes off the aircraft or instruments, as the case may be.

Interest has been evidenced in this device by other airlines. Pan American will give information on it and wiring diagrams of it as a contribution to flight safety, to any who are interested.

In attempting to provide our desired realism further, we regularly do low-visibility take-offs, which we feel are an improvement on our former instrument take-offs wherein the maneuver from the start of roll was done with the hood up. By means of the "hood" which we now use, we start the take-off run with the hinged-flap down and the trainee with his vision relatively unimpaired. At approximately 10 knots before V_1 the Check Pilot raises the hinged flap and the rest of the take-off is then completed solely by reference to instruments. This simulates, as well as we have been able, the situation where a pilot either runs into a patch of fog in the latter stages of his take-off run or loses visual contact immediately after having broken ground. We make a great many full gross-weight take-offs in the Atlantic Division into areas where, once beyond the end of the runway, there is no visual reference available, only blackness, so we stress the necessity for going on the gauges under such conditions and completing the take-off with a proper balance between gaining altitude, accelerating the aircraft, and cleaning up from the take-off configuration.

The hood which is illustrated is one developed by one of our Flight Instructors, Marvin Everett, especially for the DC-4 or DC-6B. In *Figs. 2* and *3* it is a little out of place due to problems of photography.

(*Continued on page* 42)



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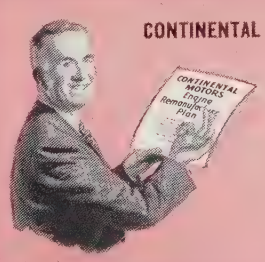

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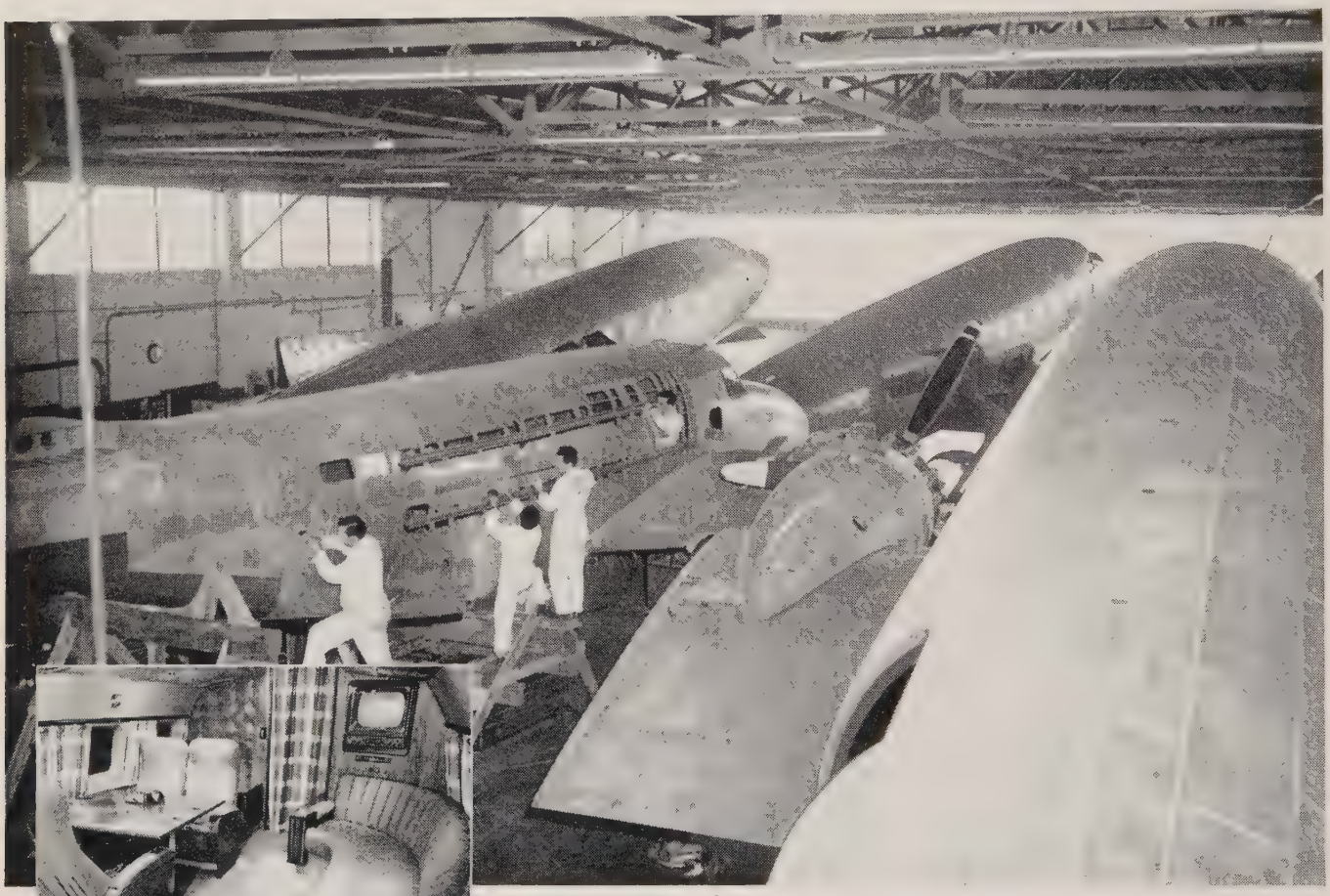

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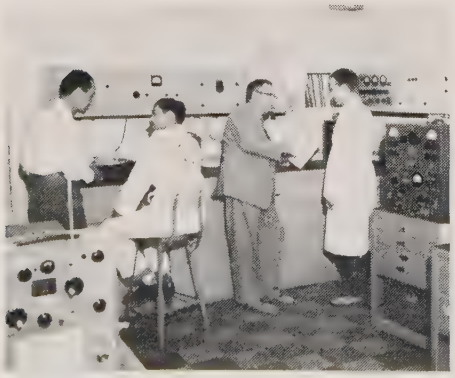

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AiResearch Aviation Service Division

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Kollsman Announces a New Counter Altimeter

It is going to be interesting to see the reaction of many experienced pilots to the introduction of the new Kollsman Counter Altimeter. Notwithstanding that there have been numerous accidents proven attributable to the old two- and three-handed altimeters and others heavily suspect, a few old-timers are going to fight the change to a direct-reading, one-hand instrument that a solo-student couldn't misread and, even less, a pilot of a high-speed military or civil airplane at a critical moment in an equally critical position.

So long a leader in the field of manufacturing aircraft instruments that many pilots speak of "Kollsman" when they mean altimeter (and it can be anybody's make!), the company in Elmhurst, N.Y. points out this is the first radical improvement in this basic flight instrument. Both the U.S. Navy and Douglas have indicated their approval with substantial orders

The new altimeter is a precision pressure instrument which registers altitude on a counter the way the mileage is shown in an automobile. The two-digit counter shows altitude in thousands of feet while the single pointer makes one revolution per thousand feet on a dial graduated at 50-foot intervals. At 23,040 feet, for example, the pilot would see the number 23 registered on the counter and 40 would be indicated by the pointer. In the photo, note that the altimeter reads 9,565 feet.

It was Dr. Walter F. Grether of the U. S. Aero Medical Laboratory, USAF, who originally sponsored the development of this type of indicating altimeter. Subsequently, U. S. Navy psychological research and flight tests which involved many pilots, confirmed Dr. Grether's findings.

Kollsman's Walter Angst directed the company research and has been a prime contributor in the development of many commercial and military aircraft instruments and systems, including the first sensitive altimeter which was perfected in 1930.

Entirely accurate throughout the entire altitude range, the new Counter Altimeter is temperature compensated to insure accurate readings within the range of from 160° F to —60° F. Loss of accuracy, due to high

KOLLSMAN *Counter Altimeter registers altitude like auto mileage on a speedometer*

G-loads during maneuvering at jet speeds, is prevented by a novel method of balancing the acceleration force, thereby eliminating the linkage and counter-weight formerly used. Friction has been reduced to a point where the slightest movements of the pressure diaphragms are transmitted into accurate pointer and counter readings. Interpolation of altitude readings of less than 50-foot intervals is quite easy and natural and is not critical in practical operation.

Although executive and business aircraft have only recently begun to operate in the levels well over 10,000 feet, the constant need to safely interpret two-handed altimeter readings under certain arduous flight condition has only been more uncomfortable and of greater concern with the increase to flight levels over 20,000 feet and three indicating hands! Now, Kollsman has brought this particular problem back to a sensible level with an instrument that can always be read right regardless of altitude.

Variable and Gusty . . . or What Goes Now

"Nothing is so sure as death and taxes,"—at least so goes the old saying. Another one might well be "Nothing is so inconstant as the military!" By that we do not mean that we would want the military planners to stagnate on obsolete designs, but just that due recognition should be given to the fact that military necessities require frequent changes of course. Thinking of the TACAN-VOR/DME controversy, where would the civil aviation industry be if, by 1965 when they would like TACAN to fully replace VOR/DME, they decide that a later developed and heretofore unannounced system warrants junking TACAN?

Why all this? Just a case in point, because in case you don't know it, the military after World War II decided that the marvelously exact instrument landing system that the military itself had devised, ILS, was superfluous in the light of GCA developments and to all intents and purposes it was dropped. All instrument approaches to a military airport would be by GCA, eliminating airborne equipment and much training and proficiency flying.

It seems that the development of "automatic approach ILS" equipment has indicated a far superiority and capacity for accurate heavy traffic handling of jets. Obviously, any number of jets can lock on to the automatic ILS simultaneously and, employing radar as a secondary aid to safeguard and establish proper interval and sequencing, a whole squadron of jets can be landed under conditions and with speed impossible with GCA alone.

More Exclusions Are Added by Port Authority

In a move both surprising and highly inexplicable to persons familiar with the constant financial dogfight between the airlines and the Port of New York Authority, the latter agency has announced a policy adding to the fast growing list of exclusions or "requirements" governing use of LaGuardia Field.

Effective May 1, all aircraft will be required to have not only the associated air-ground frequencies customarily required but also the specific LaGuardia-only (in NY Area) ground control frequency. That fact in itself is not as horrendous as the thinking behind it. The employment of 121.7 mc as Ground Control frequency at LGA was a necessary move in the real interest of safety inasmuch as occasional spillover of 121.9 mc Ground Control transmissions from Idlewild and Teterboro and vice versa,

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Ambler, Pennsylvania

Air-Aids Spotlight

ATLANTA, Ga.—*New VOR at NORCROSS ("OCR" 116.6 mc) provides Victor airway departure route equivalent to NE-bound TUCKER int. and Green 6.*

BERMUDA—*New BVOR commissioned "KDV" 114.3 mc, 1 n mi 310° KINDLEY AFB. Radar soon available.*

EAGLE LAKE, Tex. — *New VOR commissioned 64 s mi west of HOUSTON on Red 23. "ELA" on 113.6 mc.*

KANSAS CITY, Mo.—*Check revised low-visibility take-off procedures account increased height of towers in vicinity.*

LAFAYETTE, Ind.—*LF radio beacon on 227 kc decommissioned.*

LAKE CHARLES, La.—*VOR temporarily shut down for relocation.*

LOUISVILLE, Ky.—*BOWMAN Tower operates 0600-2200 only. STANDIFORD ILS back course approach requires simultaneous use of VOR.*

MEXICO CITY—*LVOR commissioned on 113.5 mc at int. runways 5R & 31.*

MOLINE, Ill.—*LFRange temporarily shut down for modification.*

ROSWELL, N. Mex.—*VOR temporarily shut down for relocation.*

SALT LAKE CITY, Utah—*ILS now serves Runway 34L. No change in approach lighting.*

SAN DIEGO, Cal.—*JAMUL radio beacon on SE course frequency change to 272 kc.*

ST. LOUIS, Mo.—*New TROY VORW on 117.2 mc "TOY" 20 s mi east of STL.*

WILLIAMS, Cal.—*New VORW on 113.1 mc "ILA."*

MISCELLANEOUS—*Most welcome chart development to date — JEPPESEN's high-density route charts. First one BOSTON-NY-WASHINGTON.*
—When flying One-Way airways IFR Plan, watch out for VFR traffic legally head-on at your altitude!
—In or near terminal approach areas, remain at least 1,000 feet below all clouds when not on ATC clearance!

was presenting a very dangerous situation. Aircraft on one field were occasionally intercepting movement clearances issued at the other fields and active runways were being crossed, take-offs and landings in progress notwithstanding.

Hence, control instructions issued by the tower on the second of the long-assigned ground control frequencies has been a boon at LGA and other airports facing similar problems. Similarly, the change to 122.7 mc air-to-ground VHF common calling frequency for aircraft originally excluded from using the "primary" tower VHF in the 118-119 mc band, has made it possible for private and smaller business aircraft to establish and maintain contact with such towers as LGA, CHI and LAX (Los Angeles). The "primary" VHF channels have been glutted and monopolized by the much higher powered airline transmitters. And the common use of 122.5 mc in multi-terminal areas has produced a similar congestion.

However, let it be noted that this change to 122.7 mc is the very reason why the latest move by the Port Authority to require a *transmitter* on 121.7 mc is, in truth, an exclusionary action with no basis in safety or operational efficiency. Inasmuch as 122.7 mc is satisfactorily employed to contact both Approach Control and Tower, while listening to the appropriate functional VHF frequency of Approach Control and Tower, the same technique can be satisfactorily employed with Ground Control.

No additional burden is placed on the controllers in one department of the control tower than in any other, whether they be using earphone or radio speakers. The percentage of traffic on these "common" frequencies is less than 5% of the over-all tower contacts. The requirement that all CAA towers guard them is based on the American idea that all taxpayers shall have equal access to taxpayer-

paid-for public facilities. It is notable that the CAA, for whom all towermen work, has adhered to this principle and is not claimed by the PA to be the instigator of this move.

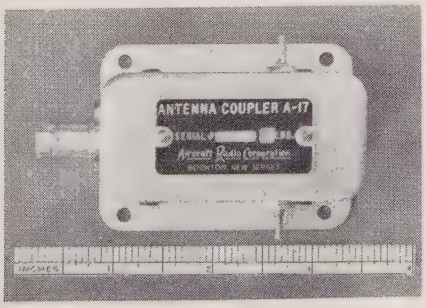
The owner-pilots and employee-pilots of the many lighter single- and twin-engine business aircraft that are daily providing additional revenue for the PA and its service agency at La-Guardia, Butler Aviation, should note that the instigator of this "suggestion," now a "requirement," is the ATA, the scheduled airlines association, reputedly one of the most powerful lobbies in Washington.

The airlines have successfully resisted the pressure of the PA to force their transfer in greater amount to Idlewild and now they seem to have demonstrated sufficient influence to raise the barrier a little higher for the increasing number of executive and business aircraft using LaGuardia. By the way, what happened to the suggestion that the airlines should buy or develop their own "Grand Central Station" terminal in the New York metropolitan area and stop using the taxpayer-erected and maintained facilities?

ARC Offers Submerged A-17 Antenna Coupler

Aircraft Radio Corporation of Boonton, N.J. is now making available their A-17 Antenna Coupler (*below*), designed to couple an airborne dipole antenna (omni-localizer) into a 52-ohm co-ax cable over a band of 108 to 125 mc.

The "submerged" dipole antenna, consisting of two rods in the shape of the familiar "V" fastened on the inside of the cockpit canopy, was originally designed for jet installation. Its attraction for commercial use, ranging from the lighter fast business aircraft up through such streamlined versions as the *Learstar* and converted attack-bombers and lately Convairs, etc., is obvious. Any move to "clean up" current business aircraft is welcome inasmuch as manufacturer's performance figures are rarely attained after the owner-users get through mounting radio and navigational gear.



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Every system in aircraft completely reworked

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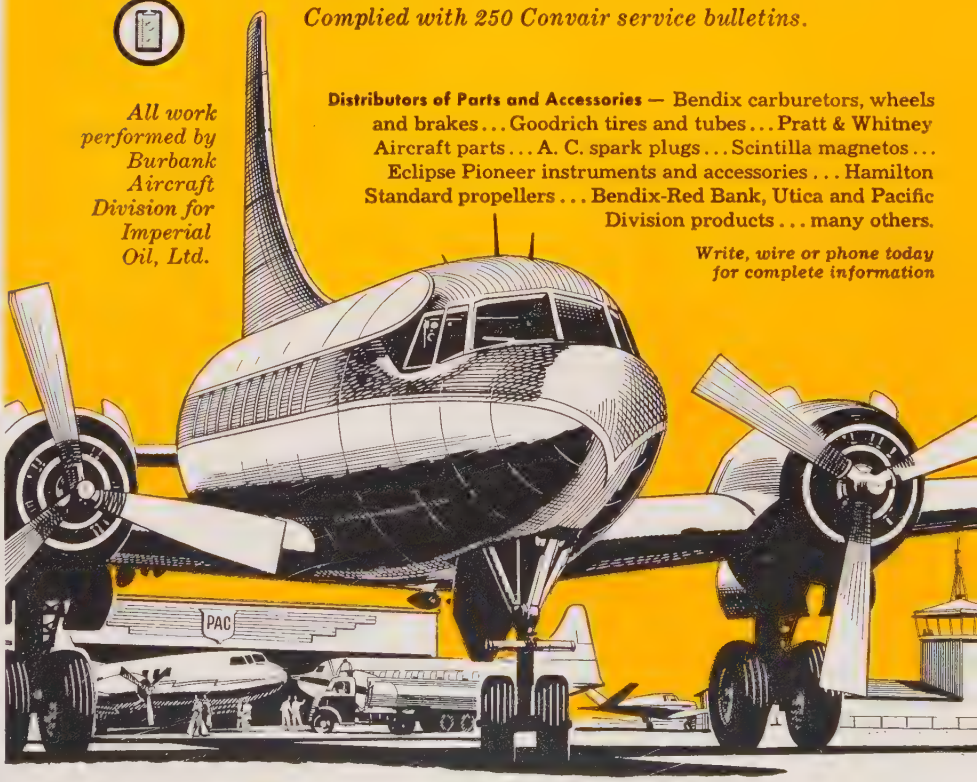
Write, wire or phone today for complete information



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British Offer New Airborne Radar

It may become an axiom in the American aviation and associated industries—"Never turn your back on the British." Our aircraft manufacturers face a highly uncomfortable time this spring and summer when Trans-Canada and Capital Airlines get their turboprop aircraft in full-scale operation. If all goes well and the public demonstrates its expected great fondness for the new mode of air travel, the competition will face the indigestable fact that the British may take a lead that will be a long time overcoming.

The lesson may be repeated in the electronics field. While RCA, Bendix, Sperry and other established ground and airborne radar development companies have concentrated on quality, the British, who were the "early birds" of radar, have added economy to quality. They are now in full production on a small, efficient and, by our standards, low-cost airborne radar with operating ranges up to 50 miles. The equipment closely resembles a miniature television set. It has a small round screen about four inches in diameter, which is swept by a thread of light resembling a windshield wiper. Sweeping rhythmically back and forth, it clearly outlines earth, sea or sky according to the tilt selected by the pilot.

On a test over the channel, the coast of Britain was clearly defined from 20 miles away. The land showed as a pale phosphorescent green while the sea was dark and dotted with tiny bright spots that were ships. Storms showed up from 40 miles away as bright oval patches.

There are three control knobs and a scanner—a gyro keeps the latter steadily in the desired position in turbulent air.

New Lear-Developed Gyro Stabilizes Free Drift Rate

A radically new type vertical gyro of greatly improved performance designed to reduce and stabilize free drift error has been put into production by Lear, Inc.

Designed as a vertical reference for such gyro-stabilized equipment as remote attitude indicators, autopilots and bombing systems, the new gyro, designated Series 2153, eliminates variations in free drift with changes in operating temperatures, heretofore a major deficiency of gyros.

Until development of the new Lear gyro, weight and stress considerations necessitated the use of materials with widely differing physical properties in the fabrication of gyro parts. As a consequence, expansion of the various components changed differentially with the operating temperature range. By using steel for all parts, however, this factor of differential expansion is removed, and the result is a predictable free drift rate that remains uniform throughout the temperature range. As a further result of steel construction, Lear engineers anticipate a substantial reduction in cost.

Other innovations in gyro engineering include the use of sub-miniaturized slip rings and brushes, self-aligning bearing suspensions, and shielded rotor and gimbal bearings. These friction-reducing features, combined with the increased momentum of the large wheel, result in a three-to-one improvement in the vital friction-to-momentum ratio, a critical factor in accuracy.

Power requirements are 115V, three-phase, 400 cycle ac, and 27.5V dc. It has 360° of freedom in roll and ±82° in pitch. Erection rate is variable between 0.8° and 3° per minute, depending upon the erection voltage used. Free drift error is less than 0.25° per minute.

Skyways Round Table

(*Continued from page* 17)

right to go somewhere as you people have.

"AOPA has advocated a number of things. We don't like the present cockpit visibility on some of our aircraft and we've asked the manufacturers to do something about it. A long time ago we tried to get the SAE to arrive at some sort of a minimum standard for visibility as they did for instrument arrangement in the cockpit. The SAE tried it and the manufacturers came back and said they weren't interested.

"What the answer is, I don't know, but I think a practical solution can be worked out if we all recognize each other's rights."

Bill Parenteau: "For the past 12 years I've been attending meetings such as this and in almost every case the recommendation of the CAA, the ATA, ALPA, etc., has been to increase the ceiling and visibility minimums. Yet they remain 1,000 and 3. I've been advised, Max, that it was *your* organization that put up the fight to retain the 1,000 and 3. Is that true?"

Max Karant: "I don't recall a concerted fight over raising the minimums from 1,000 and 3. Whenever that subject is brought up we say, 'all right, that means that you will reduce VFR flying by X percentage, but do you have facts to substantiate doing a thing of that kind?' Thus far, we've been given no facts. I'm based at Washington National Airport and I went in there the other day with a mile visibility. Now, no matter how much I fly out of Washington National, no matter what the weather is, I don't see the sky black with airplanes."

Bill Parenteau: "If the minimums were raised, you say it would reduce VFR flying by an X amount. However, at the same time you would increase the over-all proficiency of the flying public, since pilots would then have to get a ticket qualifying them for instrument flight. After all, Max, the aim of increased minimums is to increase safety."

Max Karant: "That's precisely the point I have been trying to make. Your solution is to require all pilots to have instrument ratings, file IFR flight plans, etc. In other words, you want to force all pilots to either raise their skills to a professional level, or stop flying. That's like saying that everyone who drives a car today should be required to meet the minimum standards required of a Greyhound bus driver, or get off the highways.

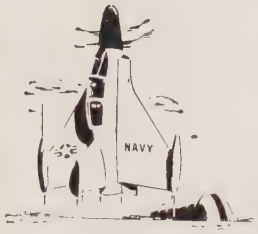
"I realize the New York area is congested and that you have your problems, but I must again point out that we have ours, too. One of your own airline pilots had a near-miss one day when he was flying a Cessna 140—and in perfect weather, too. A DC-6 went by him so fast and so close that all he saw was a flash of blue and silver. He was blown over on his back and it was just lucky he didn't end up a statistic. When the CAA tracked down the airline crew, they were all called on the carpet—the pilot, copilot and stewardess of the airliner, and the pilot who'd been flying the Cessna. Investigation showed that the flight of the Cessna was legal and proper in every respect, even by CAA specifications. Yet the airline pilot never saw the Cessna. He had his DC-6 in a climbing turn out of LaGuardia, was going like the devil, and came within a hair of knocking this personal-plane guy out of the sky. Now we make an issue of things like that. We're not haggling over 1,000 and 3 nor anything else that's been brought up except your thinking that the only obvious solution is to get the Cessna out of there."

Neil Fulton (*Pilot, Olin Mathieson Chemical Corp.*): "I've flown both the *Bonanza* and the DC-3 for a long time, and know the problems on both sides. If the limits were raised to 1500 and 3, I don't think any pilot would object.

"If the minimums in the high-density area, say LaGuardia, were 1500 and 3, and a pilot were to take off from Bridgeport to fly to Philadelphia, wouldn't he be willing to fly via White Plains and Chatham instead of flying through the LaGuardia area? It might cost him another 20 miles, but I bet he'd be willing to do it. A lot of my runs are from Baltimore to LaGuardia, and when I have such a trip to make, I give a lot of thought to wind direction and velocity and where the smoke

(*Continued on page* 35)

PLANE FAX



Your Best Week-end Flight Plan for May

Army and Navy aerial demonstrations will be part of the annual Armed Forces Day air show at Moffett Field, Calif., May 21. Land at nearby Palo Alto Airport for quality Standard Aviation Products and service.

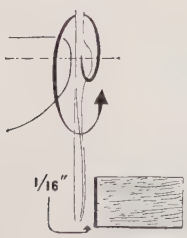
Herding hungry ducks by air

Twisting back and forth above the rice fields in California's San Joaquin Valley, Frank Gallison drives feeding ducks out of the grain and toward surrounding game refuges and grasslands. Before he started this herding, farmers in the area often lost half a crop in a single day to migrating ducks.

One of the most experienced fliers in the West, Mr. Gallison has logged 20,000 hours, mostly in low-flying farm work. "Making turns 50 feet above muddy rice fields calls for plenty of extra power," he says. "I always get it with Chevron Aviation Gasoline 80/87, even on hot days when the engine is frying. It burns clean, too; never fouls plugs. I've used Chevron 80/87 in all my light planes ever since it came out.

"And in spite of the tough flying I do, I've never had engine trouble since I started using RPM Aviation Oil. I've gone 1500, 1700, even 1900 hours between overhauls, until I take them down just because of the hours. 'RPM' holds wear down to next to nothing, keeps the rings and valves as clean as new. I wouldn't use anything else."

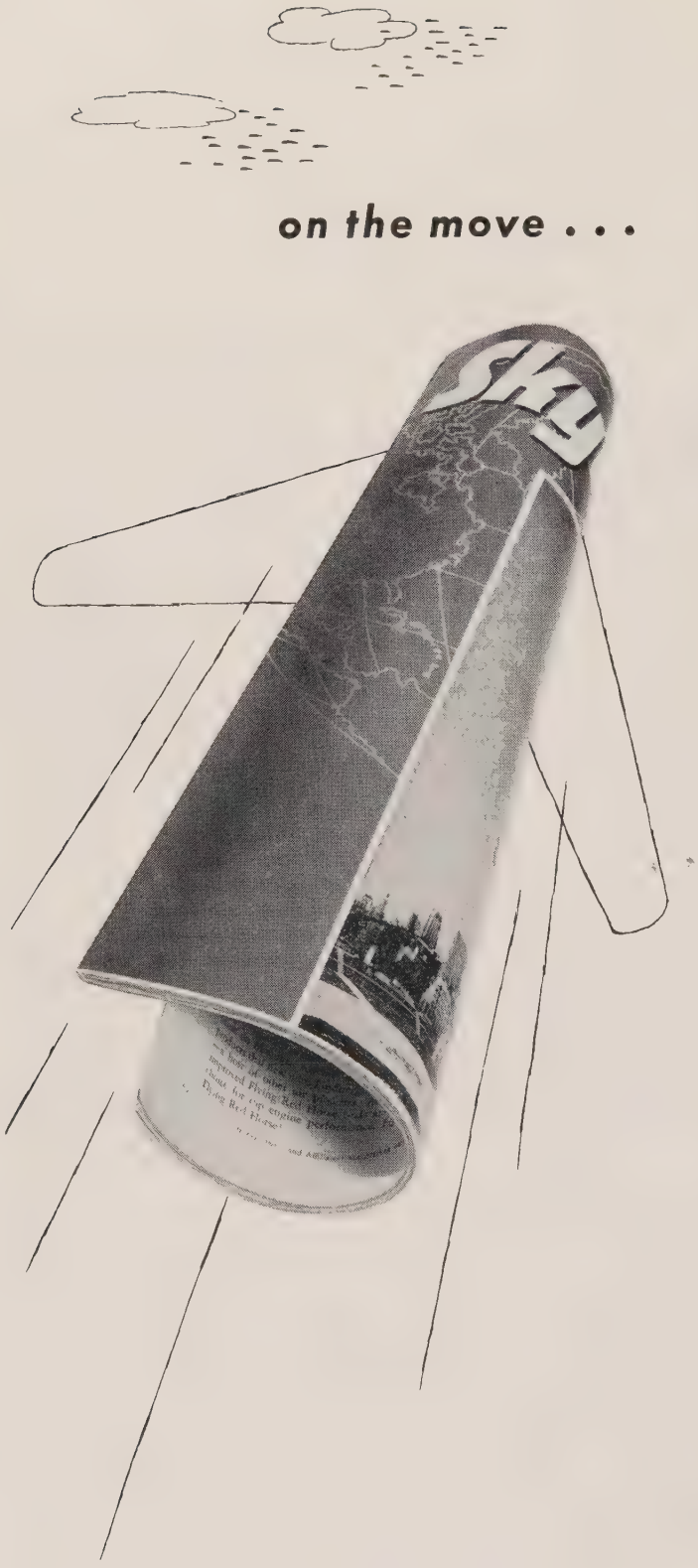
T. M.'S "RPM," "CHEVRON," "PLANE FAX," REG. U.S. PAT. OFF.



TIP OF THE MONTH

If your engine sounds rough, make sure your propeller "tracks" within 1/16-inch. Bring one tip down to a support, then pull the other down and measure the distance between it and the support.

CHEVRON AVIATION GASOLINE
RPM AVIATION OIL
STANDARD OIL COMPANY OF CALIFORNIA



on the move . . .

on April 23

Skyways

moved to

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to meet the needs of an

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The field of Flight Operations is growing in size, importance, and revenue. It's a market with tremendous potential! And Skyways Magazine, the only publication devoted exclusively to Flight Operations—business, commercial and military—is keeping pace with its growth.

Our new, greatly expanded quarters in Bristol, Conn., will enable us to maintain closer liason with our printers, and enable our editorial and art departments to handle late news right to within minutes of press time! It will also give our circulation and advertising departments the added space they've needed to operate at peak efficiency.

our new address: **Emmett Street, Bristol, Conn.**
Phone: Ludlow 3-5815

Skyways Round Table

(*Continued from page* 32)

go VFR, I do it. If there is an east wind, I plan my route east of Philly and I usually have 8 to 10 miles visibility. By the same token, if LaGuardia has 3 miles with an east wind, I go up a little east of Sandy Hook and it helps a lot.

"Actually, if the boys who are flying the *Cubs,* etc., and who haven't ILS and the necessary equipment to make a let-down through the clouds, were requested to avoid high-density areas within a certain mileage, I don't see how or why they wouldn't go along with such a suggestion."

Max Karant: "The important point is, you said 'if they were *requested.*' But that isn't the case. A bunch of fellows in Washington have written laws or are trying to write laws that say 'you will do this' or 'you will do that' without regard for visibility, weather or anything else. They say, 'do it and don't argue with us.' We ask them to give us facts and they come up with nothing. They just arbitrarily draw a line and say, 'you will not go through that airspace at any time.' That sort of attitude brings about only one response and I don't have to tell you what it is.

"AOPA endeavors to educate its pilots. We publish accident case histories by the dozen and point out where the pilots involved are doing things that are wrong. I know one thing: if someone will teach them, they'll learn. We do get a screwball every now and then. We had just such a pilot not long ago. He insisted on taking off from an airport under IFR conditions, on a VFR clearance. It was in California and this guy was used to flying in the smog. Within five minutes of that take-off, however, the boys in the tower saw him come spinning out of the bottom of the clouds. Of course, you can't punish a dead man, but a lot of people learned a lesson from that one. Furthermore, all this guy's insurance was voided because he had violated the CAR's."

Neil Fulton: "I have heard of people who do the same or similar things. They take off anytime and just shuttle off someplace —no clearance, no flight plan—into instrument conditions. They climb up through the clouds and let down on the other side. My contention is that there should be some regulation at the airport whereby that kind of pilot can be stopped, because he is not only risking his own neck, he's also risking the lives of people on the ground."

Max Karant: "So far the CAA has shied away from such a regulation, probably because it places responsibility on them. The individual airport managers also shy away from that kind of regulation because it places legal responsibility on them."

Frederic J. Shaw (*Asst. Dir. Flying Operations—Admin. American Airlines*): "Everyone recognizes the increasing danger and exposure to aircraft collision under congested traffic conditions. There's an old maxim to the effect that 'as the times change, the circumstances that surround them must also change.' That applies here. We have had a set of regulations in the past which fitted their purpose well for those times. However, times have changed.

"In the last six or seven years there have been more than 100 mid-air collisions involving civil aircraft. I doubt that anyone here advocates any one cure-all for remedying this situation, but certainly one of the approaches might be in the direction of improved cockpit forward visibility. There also should be adequate aircraft lighting at night, and perhaps colored markers should be painted on airplanes for daytime flying. Another thing, under certain haze and smoke conditions it is difficult for a pilot, even after having sighted another airplane, to establish that plane properly in its frame of reference to himself. An aircraft silhouetted against the ground may present a different relative movement from one that is silhouetted against an overcast.

"The very question of VFR definition is in itself a nebulous one. What is VFR when a pilot is flying west at sundown? What is VFR to the pilot on the opposite side of the airway at the same time and at the same altitude, flying eastbound? What constitutes forward visibility under varying atmospheric conditions?

"Certainly, these things must be subject to precise regulation to which everyone must submit, whether it be in terms of lighting, marking of aircraft, required cockpit and aircraft lighting, or clearly defined ceiling and visibility restrictions.

"In high-density areas everyone, whether they are carrier or private-plane pilots, must subject themselves to regulations, and those regulations must be written for the greatest safety of all. Anyone piled up in a mid-air collision does not enjoy immunity to death or injury by virtue of the fact that he is or is not a professional pilot.

"The rules do not deny any pilot the right to the airspace, but they do impose on him certain regulations dictated by duly de-

(*Continued on page* 36)

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Skyways Round Table

(*Continued from page 35*)

signated and competent agencies which are charged with making these regulations in accordance with certain procedures.

"I do not think it is unfair in any sense to impose 1500 and 3, 2500 and 5, or whatever the limits may be, provided it promotes the public welfare and the regulation is logical and legal. Any agency which promulgates a regulation on the basis of partiality to any group would immediately be subject to attack in the courts as being arbitrary, prejudiced, not having any foundation in fact and not being substantiated by the weight of evidence. Certainly, one of the attacks on this high-density traffic problem must be impartial regulation for the benefit of all users of the airspace."

R. H. Carpenter: "I see no reason in the world why the responsible people that Max represents should object to increased visibilities and increased minimum ceilings for VFR. The people we worry about are the screwballs, to use Max's expression, and the only way you can keep the screwballs out is by regulation. Regulation coupled with radar surveillance would be a big step in the right direction."

Max Karant: "You cannot write regulations based on the assumption that everyone is a screwball or knucklehead. The regulations must be written for the vast majority; and these are prudent, careful, responsible people who—by and large—can and do obey reasonable, sensible regulations. I disagree strongly with the statement that the only way you can control knuckleheads is by regulation. Such a thing is physically impossible. Neither you nor anyone else can devise a regulation that will, for example, prevent a competent, well-qualified professional pilot from suddenly pulling on a control gust lock in flight, and nearly killing a whole planeload of passengers.

"That figure of 100 mid-air collisions is misleading. Today we are discussing high-density areas and those 100 mid-air collisions include collisions between crop dusters, training planes, etc., flying out of the 6400 U.S. airports. Considering the present volume of flying, I don't think that's such a bad record.

"Of the mid-air collisions on the record, all but one of them occurred under VFR conditions. In the great majority, weather was not a factor. So we look at other possible reasons and come up with cockpit visibility or the conduct of the people involved. All of these things add up and it's on that we base our position in this matter.

"The tendency right now is to raise the minimums that apply to the weakest link in our chain of people who fly. The airline pilots maintain that all a pilot has to do is fly IFR when the visibility drops. But you can't fly IFR unless you're equipped and qualified. In fact, if private pilots in substantially large numbers were able to qualify for instrument tickets, the whole system would break down because today our IFR operations are so overloaded that they can't handle it. You airline pilots are the best examples in the world of how complex and difficult it is to operate under IFR conditions with our present traffic control system. Therefore, it is no good to say, the answer to this is to raise the minimums and if a pilot runs into smoke or haze, he can fly IFR. The private pilot simply can't do it and his only other choice is to stop flying. If you stop him for any substantial period of time, it will do serious damage to civil aviation."

Capt. Pangburn: *"Increasing the minimums would impose a lot of restrictions and also add expenses to the operating of an airline. If 1500 and 3, for example, were to go into effect, there would be many delays due to IFR traffic on the airways and the carriers would have to absorb that delay. Now as far as 1500 and 3 is concerned, how serious a restriction would that impose on VFR traffic in a high-density area? I would think that the 1500 and 3 minimum in the LaGuardia area would be an advantage, safety-wise, to the itinerant."*

Max Karant: "But actually, the way you are protecting him is by keeping him out of the area entirely. The private pilot simply can't comply, so he's out. In the case of the air carriers, the maximum difficulty they face with raised minimums is purely economic. You sit there and fiddle around with IFR operations, and then you go. But remember, you *go*. In my case, I *don't* go."

Capt. Pangburn: *"Then you think 1500 and 3 would be unduly restrictive?"*

Max Karant: "I'm merely saying that any major change must be well founded. It cannot be a casually made decision. To know what affect it would have on flying we'd have to take the number of days we have 1,000 and 3 and then take the number of 1500 and 3 days and subtract one from the other to know what the weather percentage is. There isn't any way of measuring how much flying would be stopped because nobody bothers to note whether I go out and fly or not. The air-carrier operations, however, are tabulated."

Capt. Pangburn: *"As far as statistics are concerned, you said you were reluctant to file a violation report. I stated earlier that for every violation or incident that was reported there were probably 10 that were not. The fact remains that incident reports are on the increase, even with this prevailing reluctance to file against another pilot."*

Max Karant: "We went into this incident report in connection with the proposed Washington zone and came up with just two—one of them involving a military plane and the other, a CAA pilot!"

Bill Parenteau: "In this matter of statistics, I can't give you the exact number, but I can state that when we have had lost aircraft, or aircraft that have arrived unheralded in the LaGuardia control zone during VFR marginal weather, the greater percentage of them turned out to be what you have referred to as 'screwball' pilots. Normally, they are not air carrier nor NBAA aircraft, but they are privately owned civil itinerants."

Max Karant: "If he's doing something wrong, we want him tagged just as much as you do. But you'd better take a second look at your statistics. Not too long ago the CAA made a study of the lost-aircraft problem in the New York area, and their findings make it clear that the civil itinerant pilot is involved only at about the same rate as are other classes of pilots. In view of the fact that these civil pilots are the only non-professionals involved, I believe they have a surprisingly good record."

Bill Parenteau: "Perhaps the regulations should be such that the itinerant pilot will have to contact the tower before he enters the control zone."

Max Karant: "I'm sure even the airline pilots know how easy it is to get trapped or caught in a bind and not have any way out. We private pilots rely entirely on the U.S. Weather Bureau . . . and I don't think I need to say any more. When you fellows are caught in a box like that, you get on the gauges and keep going. You call on your company frequency or some other frequency, get more info, and on you go. In my case, I must either get down some place or turn back. I get on the radio and call somebody and then hope they hear me and reply. Often they don't because they're busy with someone else.

"You fellows are used to push-button radio receivers and transmitters with 50 channels or more. We have as few as four channels. They are about to put in a new channel at LaGuardia and we can't get it in a lot of our airplanes even if the owner is willing to buy the $10 crystal. You get so high-fallutin' with normal everyday problems that you lose sight of what's going on. The people who fly our airplanes pay for them with their own money. They're limited in weight, in equipment, and they're limited in experience, but still they're trying to fly."

Bill Parenteau: "I'm not trying to stop that man from flying, but I *would* like to see him fly somewhere other than in a highly congested area. He has a lot of airports other than LaGuardia at which he could land. What about Teterboro?"

Max Karant: "Teterboro has the same problem, and the boys in that tower are also screaming and hollering about aircraft coming in unannounced. You can't send us to Linden 'cause then we'd be right smack on the approach zone to Newark."

Neil Fulton: "When you have 1,000 and 3 at LaGuardia, at least 50% of the metropolitan areas is less than 1,000 and 3. During those periods, the airplane is illegal, but how many pilots are going to turn back? That's the reason I believe we should have this higher ceiling and visibility. Then the pilot who is above and coming in on IFR can go right on down and have a little more protection.

"I'll go along with Max on this equipment business. Even with the best equipment and at 1500 feet in the vicinities of New Brunswick and Freehold, many times I've never been able to raise approach control. Sometimes I've had to have the boys who are up a little higher relay in for me and then I check as I go by Flatbush and get my clearance on in. All this is under VFR conditions, not marginal but just smoky which is a serious deal in itself, and the reason why I've been avoiding these smoke areas.

"At night, we should have even more regulation. At the 2500-ft level between Washington and LaGuardia, with a 3,000-ft ceiling for example, everybody is VFR trying to save time. One night, on a flight between Richmond, Virginia, and Baltimore, my copilot and I counted 42 airplanes beneath a 2,000-ft ceiling! There's something wrong there, too. I don't know how you can rectify that situation, but if you're not planning to land at Washington, LaGuardia,

Philly, etc., it might be well to avoid the immediate areas associated with their airports."

R. K. Smith (*Chief Pilot, Kudner Agency, Inc.*): "No statistics are necessary to prove to me there's a hazard in these high-density areas, and even if everyone did observe the regulations to the letter, it would still be a hazard. Perhaps private pilot education is the best answer. But I'm also in favor of increasing the minimums."

Capt. James A. Rogers (*Pilot, Swiftlite Aircraft Corp.*): "I also am in favor of raising the minimums, but I would not recommend that they be raised until such time as an adequate number of controllers are added, particularly in the New York area, since an increase in VFR minimums would necessarily bring about an increased number of IFR days.

"One thing that would help considerably would be more honest position-reporting by all pilots. Pilots jumping the gun put an additional and unnecessary burden on approach control. Another would be the wider use, in high-density areas, of simplex communications whereby everyone on the frequency would hear the transmissions of both tower and aircraft and thus be more rapidly informed of each others' position.

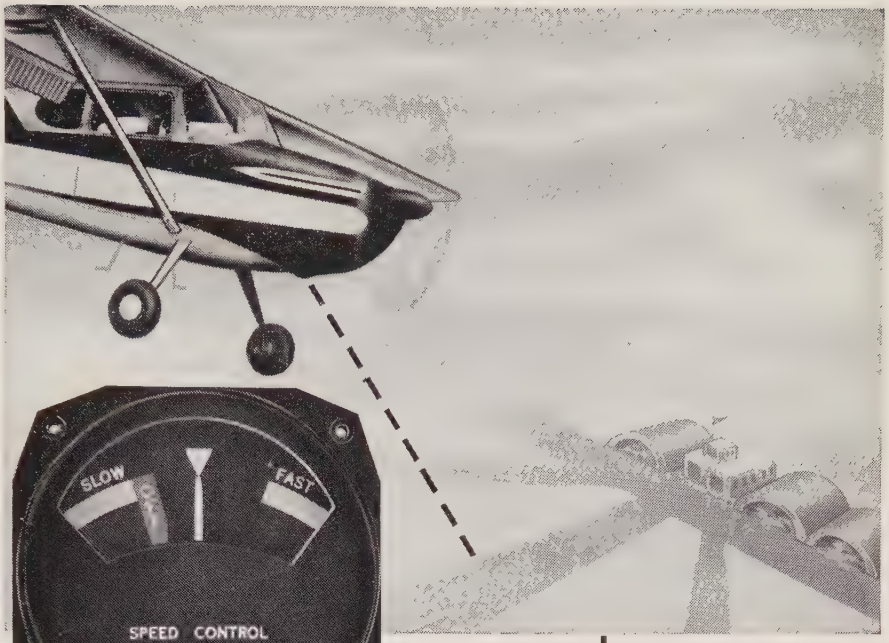
"In regard to the lightplane itinerant pilot, he gives me less concern than the air carriers when it comes to near-misses and mid-air collisions. In my opinion over 90% of these lightplane owners have a healthy respect for the high-density areas and do avoid them on the marginal days. It's apparent to me, from this and other discussions, that some of the air-carrier pilots, having been with the carrier for 15 or 20 years, have lost touch with this and the other phases of flying. The present day lightplane itinerant is not to be compared to the 'haphazard Harrys' that we had in the '30's, thanks to the CAA and improved instructional technique."

C. J. Stock: "While I have endorsed increased VFR minimums, I'm also aware of the fact that a great percentage of the mishaps have occurred during good weather. Merely increasing the minimums is not the complete solution, nor would supplementing the raised minimums with speed control be the complete answer. I, therefore, suggest a poor-man's anti-collision radar in the aircraft.

"It would be impossible to place the entire responsibility for separation of aircraft operating in the volume we anticipate, on one person. During CAVU weather in terminal areas, traffic is put in the hands of eight controllers, and as you introduce additional controllers at one terminal, you are faced with the need for coordination between them. The whole system becomes unwieldy. Therefore, I suggest that we go after improved cockpit visibility in conjunction with a poor-man's collision radar.

"Looking ahead to the day of still faster aircraft operating at even higher altitudes, we're going to find even greater need for improved cockpit visibility and anti-collision radar. In talking with a number of BOAC pilots who had flown the *Comet* in regularly scheduled operation, I was surprised to learn that in no instance in the operational stage between London

(*Continued on page 38*)



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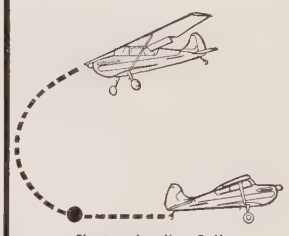
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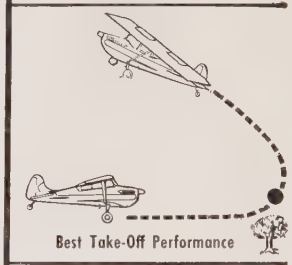
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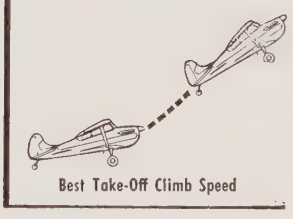
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Skyways Round Table

(*Continued from page 37*)

and Rome did they ever see each other, even though they were in direct communication and were passing position reports back and forth. That is what we face in the future here, and that's why we are going to need greater separation, more reliable altimeter indications, and an anti-collision radar."

Capt. Pangburn: *"Mr. Stock and Bill Parenteau, I'm still confused on one particular point which I have discussed with CAA inspectors, tower operators, etc. As I read the regulation and as I understand the CAA interpretation of it, it is legal and no violation of a regulation for a pilot to taxi out with reduced visibility and ceiling and take off, as long as he taxis out VFR. You cannot actually prohibit his taking off. I witnessed that situation at Indianapolis some time ago. I was grounded there for two days because I didn't have take-off limits for the Convair. The ceiling was 100 ft and visibility was ⅛th of a mile. I happened to be in the Indianapolis tower when a* Bonanza *taxied out, said he was going VFR, got his clearance and off he went. The whole idea astounded me and I got into quite a hassle with the tower operators over it. We spent a couple of hours pouring over manuals, regulations, etc., while the tower boys proved to me they were in no position to deny him a clearance under those circumstances. I inquired as to where the pilot was going and discovered that he went out six days a week, regardless of weather, flying a load of bull semen to some place in North Carolina!*

"Frankly, I just don't understand that situation. I'd been in the tower there long enough to know there was traffic overhead, and I don't see how this fellow could get to the Carolinas VFR when the ceiling was 100 ft and visibility ⅛th of a mile. Furthermore, there wasn't a ceiling reported to be above 300 ft within 200 miles of Indianapolis. And yet the CAA people tell me that pilot was completely legal."

C. J. Stock: "Your summation of that situation is correct in that the pilot may call for and receive a clearance to leave the control zone, and it is the responsibility of the controller to provide separation between that aircraft and others operating on instrument flight plans. But after the aircraft has left the control zone, he may be legally operating outside the control area which is 700 ft from the surface, and we have no control over him."

"Looking back over what has been said, I think we were pretty close to the right track when we discussed facts relative to certain qualifications for certain types of work in certain airports and for certain types of equipments, etc. It's a recognized fact in the air-carrier business that it is physically impossible for certain types of aircraft to use certain airports. For example, we can't utilize LaGuardia Field for DC-7 operations. And the other night LaGuardia was above minimums and Idlewild was below, but that was just too bad. Perhaps therein lies the solution to the problem . . . that certain airports require certain qualifications for aircraft, pilots, etc. Full control should be established for those pilots making full instrument approaches at these airports and they should be afforded full protection while on those approaches.

"We are fast moving into a stage of higher speeds and heavier fuel loads that are becoming more critical. In fact, we're noticing it on long-range flights now, what with longer holding patterns and things you cannot put up with. Therefore, controls have to be more positive and not cause indefinite delays. You must be able to come in and know who's going to be in the area and how long it's going to take him to make his approach and land. We must not hold back the development of positive controls for turboprop and turbojet operations for the few *Cub* pilots. True, he has a right to fly and he must be provided with airspace to fly in, but he must not be allowed to become a hazard or a deterrent to the traveling public."

Max Karant: "The 'few *Cub* pilots' Capt. Tuxbury refers to comprise a total of some 90,000 civil aircraft owners. All the airline aircraft registered with the CAA, both for domestic and international airline operations, come to a total of just over 1500 airplanes. Yet Capt. Tuxbury would have you believe that the airspace really belongs to the commercial operators, and that any *Cub* pilot who wants to fly to New York should be forced to land at some place like Allentown and take a train the rest of the way. I can tell you now that this 'party line' can only alienate and antagonize the many thousands of aircraft owners throughout the country.

"In my opinion, this sort of proposal can only lead to a move to force the commercial airlines to operate into high-density areas only within certain clearly defined channels, and nowhere else. There is much to be said for the use of corridors by high-speed, relatively blind transport aircraft, not only for the protection of other aircraft in the airspace but for the protection of the airline passengers."

Capt. Ross: "From my own experience, I'd say that the greater portion of near-misses occur not in the high-density areas but in the medium- or low-density areas where private planes, the airlines and also some military use the same airport. Also, most of the incidents have not been due to weather. I'm all in favor of raising the VFR ceiling, but I'm even more in favor of raising the VFR visibilities. In nearly all cases where visibility is officially given as 3 miles, you will find it isn't that from where you sit in the cockpit. An immediate solution would be to raise the visibility minimum to at least 5 miles, then if it is officially listed as 5 miles visibility, you can be sure it's at least 1 mile.

"Anti-collision radar is certainly a needed step, although it isn't the sole answer and won't be unless you can have a radar that has at least a 180° sweep. Most of the near-collisions have not been due to overtaking traffic, most have been 90° traffic."

Randy Carpenter: "I've had an opportunity to look at what is being done with anti-collision radar, and it looks right now like a pretty doubtful solution. Radar of certain frequencies are available that can give you the targets. However, they

give you *all* of the targets, thus placing you in the position of having to decide for yourself which is the target that is on a closing course. What actually would be needed is some form of computer integrated into the anti-collision radar; either that or you'd have to accept the fact that you see everything . . . and you might have 50 airplanes on your scope all the time. Obviously, that would be of little value. One other possibility lies in the application of the Dopler principle. Separation, however, would still have to be maintained by ground radar."

Capt. Pangburn: *"Let's have our summations now."*

F. J. Shaw: "We've talked a great deal about regulations and their affect on certain groups of people. Certainly the complexity of the present problem of VFR flying in highly congested areas is such that affirmative action must be taken. However, no one single action is going to provide the entire solution. I think it has been agreed upon here, and I concur that more extensive regulation is one of the steps indicated. The ports have stated that in all forms of transportation there must be progress; that if further regulation is required, it will be measured only in terms of how it fulfills its purpose and not in terms of the fact that those regulations would curtail certain individuals who are unable or unwilling to meet them. I think, therefore, from my own personal viewpoint that the ideas concerning regulation that have been expressed here today, would not in any way deny any substantial right of any pilots, private or otherwise, nor would they in any way be unreasonable."

Capt. Tuxbury: "There is no question in my mind but that every man in this room has contributed to the best of his ability to keep from becoming a statistic, and neither is there any question in my mind but that the organizations we represent have bent every effort to do away with the hazard that exists. But to say that the statistics do not prove there's a problem is entirely wrong. In the words of a good friend of mine, it is not because of the fine efforts of the CAA or the airline pilots or the airlines, or the private operators or anyone else, that we haven't had more mid-air collisions. It's only because God Almighty put so much space in three dimensions."

R. K. Smith: "I would say that we should have more realistic VFR regulations to fit today's aircraft and traffic condition, better enforcement of those regulations, and also a system to thoroughly familiarize the private pilot with such regulations."

Capt. Pangburn: *"Our discussion appears to have crystallized into two positions: one favoring an increase in VFR minimums in high-density areas; the other opposed to any change until such time as statistics compel a change. Airline and executive pilots have become increasingly disturbed with the VFR problem because of the increasing rate of near-misses between airline, executive, military and itinerant aircraft. Unfortunately, one might conclude from what has been said here that this is a dispute between the itinerant pilot and the airline*

(*Continued on page* 44)

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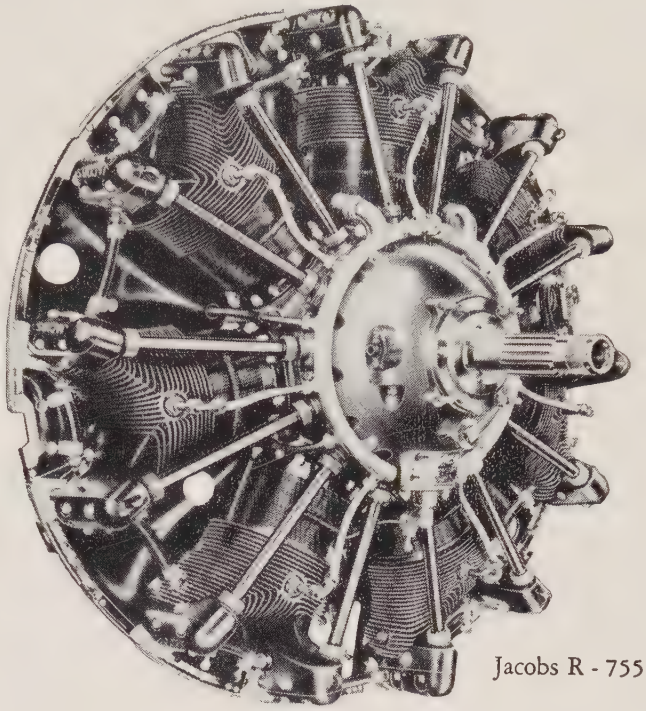

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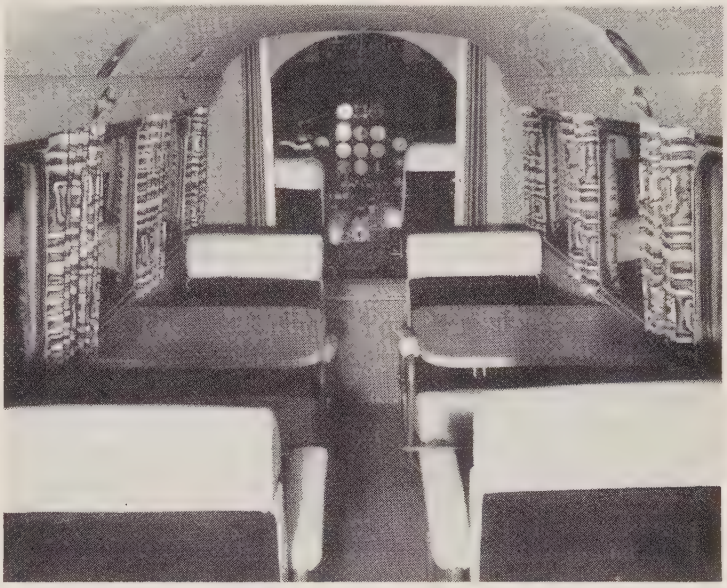

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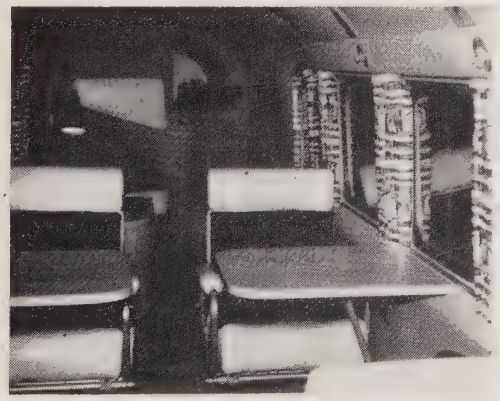

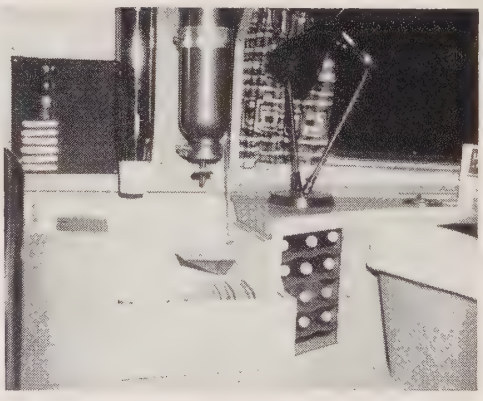

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Box 501

Pilot Training Program

(*Continued from page 27*)

Actually, the large edge of the hood should fit farther to the left in between the raised edge of the glass and the spring-loaded opening handle of the clear vision panel. The fourth picture is a view from the right-hand pilot's seat and illustrates the high degree of success of this arrangement in eliminating any obstruction to the instructor's vision—a very important consideration for training in the New York area. The spring clamp by which the panel is attached to the glare shield is reversible so that the hood can be fitted to either the left or right sides of the cockpit.

The other maneuvers on the check are pretty much standard airline practice, so I will not go into them in any detail.

The next item on the year's program, Link Trainer, is one on which there has been considerable unfavorable comment within the industry due to the relative obsolescence of the equipment and the fact that there is little similarity in the handling characteristics between the trainer and the actual aircraft. We are fully aware of these deficiences but by modifying our, by now, ancient and venerable Link Trainers, equipping them with Curtiss-Wright automatic range and ADF equipment, converting this for VOR training, and by installing modern instrumentation such as Omni-Mags and RMI's, we are able to get great benefit from our Link department in the instituting of new procedures as well as maintaining competency on the 10 or more types of instrument approaches with which our pilots are faced over the routes which we fly extending from Chicago and New York on the west, to Hongkong on the east; from Scandinavia on the north, to Johannesburg on the south. Additionally under the heading of Link Trainer, we include considerable personal instruction which comes under the title of, "Complete Review of the Route Manual and ATC Discussion." This consists of personal tutoring on and discussion of many of the finer and more obscure points of airways procedures and then the trainer itself is used to demonstrate the procedures, much as one would use a laboratory instrument.

Following up on the Link work is a DC-3 flight. Here again we have modified the aircraft as to its instrumentation and radio navigational facilities so that we are able to use this relatively inexpensive-to-operate piece of equipment to brush up on the niceties of approaches and area problems with a consequent eventual saving in flight training with the regular line equipment, because we are then not required to waste time on fundamentals.

The next period is the ground school refresher which is an intensive four-day

course covering systems and designs, emergency equipment and evacuation, cruise control and performance. The examinations on this work are comprehensive and are carefully graded so that any unsatisfactory knowledge is uncovered and corrected before the pilot returns to the line. Recently, we have added a fifth day to the refresher although it is not a mandatory requirement. On this day, we give several lectures by specialists on subjects which are designed to improve a pilot's general knowledge and to prepare him for developments within the industry.

Then, several months before coming in for the next periodic technique check, the pilot receives a flight of periodic instruction in his line equipment. We feel that this is the time when we can best raise the standard of proficiency of the individual and give him the opportunity to polish up his skill which, while satisfactory from a minimum competency point of view, can often be improved by some judicious coaching. Here is where we find an entirely different relationship in the cockpit between the student and the instructor. On a check ride the main purpose of the flight is the student's unassisted performance of the required problems and the Check Pilot's evaluation of his abilities. On this periodic instruction ride, the attitude is one of complete assistance and a sincere desire to improve the pilot's competency.

The second six-month period is practically identical to the first with the exception that we substitute the four-hour ground instruction period for the periodic-instruction flight. This period was originally treated with considerable skepticism but has now been unanimously accepted as a very worthwhile addition to the training program. The Instructor in this case is a flight engineer specialist who, with a pair of pilots, completely covers the aircraft from stem to stern and inside and out as to location of all equipment, its uses, and how it functions. This is, of course, an individual tutoring job and gives a pilot an excellent opportunity to straighten himself out on any points concerning which he is interested. The latter part of this period consists of going through all emergency procedures as realistically as possible, including the use of all the emergency check lists. That, in brief, is the program we are using at the present time.

Before closing, however, I should like to point out that this program is tailored specifically to our particular requirements and to our particular philosophy of operation both of which are influenced by the long-haul nature of our operation with the consequent minimum of actual take-offs, landings and instrument approaches. It is further influenced by the wide variety of countries and weather areas through which we operate. As such, this program may not be directly applicable to any other type of operation and it is presented here only to stimulate your thoughts as to whether or not some of our ideas and methods might not be an advance over those presently in use. Perhaps adaptations of our program would meet the requirements of local or short-haul airlines or even company-aircraft operators. ✈

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Skyways Round Table

(Continued from page 39)

and executive pilots. The position of the majority here in favor of increasing minimums is not predicted upon any intent to unduly restrict or infringe upon the rights of any pilot.

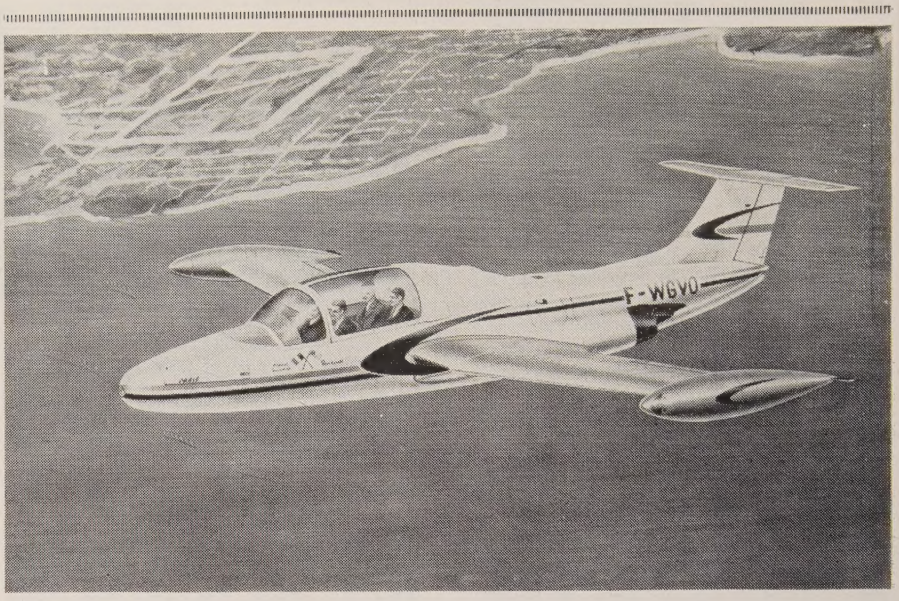
"Mr. Karant's argument appears to be based principally on rights. I am certain that we all share his view that the itinerant pilot has as much right to the airspace as any other pilot. We do not believe that any pilot should be permitted to exercise that right in such a manner as to jeopardize the lives of others both in the air and on the ground. Present VFR's, in effect, establish a dual standard and apply it to the same situation. It has been established here today, that an itinerant pilot, untrained and unequipped for instrument flight, may legally take off or land at a high-density terminal under VFR when the reported weather is at or below IFR minimums. The type of controlled departure or approach he makes under these conditions is at best nothing more than a compromise with safety.

"It is difficult to see how an increase in VFR minimums in high-density areas would be a serious deterrent to civil aviation. We are talking about places like LaGuardia, Chicago, Washington, Newark, etc. The weather in these areas is not so bad consistently that the itinerant would suffer under any reasonable increase.

"In conclusion, I believe this matter can best be resolved by recognizing these facts:

1. *Traffic in high-density areas has increased a thousand-fold in recent years and is continuing to increase.*
2. *Heavy traffic in these areas, under poor visibility conditions, presents a definite hazard.*

"Therefore, it seems only logical that under these conditions the danger of collision or near-misses would be greatly minimized by increasing minimums sufficiently to provide the extra seconds a pilot needs to determine the proximity of other aircraft in relation to his own."



Beech Announces Twin-Jet

Beech Aircraft Corporation has added a new four-place, twin-jet, pressurized executive transport to its line of business aircraft. Designated the M-S 760, the plane was designed and built by the French aircraft manufacturer, the Morane-Saulnier Company with whom Beech is working to bring the twin-jet to North America for demonstrations this summer.

Commenting on the general features of the M-S 760, Jack Gaty, Beech vice president and general manager, stated: "The M-S 760 stands alone as the first and only twin-jet aircraft in the four-place field available now for demonstration. First flown as a prototype over two years ago, the 760 has hundreds of hours of successful flight operation and has been tested in actual demonstrations under all sorts of climatic conditions.

"The M-S 760 is a four-place, twin-jet, low-wing monoplane with a fully pressurized cabin and offers the same cross-country speed as the most advanced airline transports. It has the same cruising speed as the DC-7. It will operate out of medium-sized airports . . . and will have a visibility never previously offered in any civilian airplane. All the occupants sit forward of the leading edge of the wing and are surrounded by a one-piece pressurized bubble canopy. Adjustable overhead curtains will protect passengers against excessive sunlight.

"The airplane has a useful range which will enable it to make non-stop flights between New York and Chicago, St. Louis and Washington, Seattle and San Francisco, etc."

Mr. Gaty further reported that Beech Aircraft was not certain of the cost of the M-S 760 when made in the U.S., nor could he state when deliveries would begin. He added, however, that Beech officials expected delivery dates to be reasonable, in view of the fact that the airplane already had been well tested, and that they did not believe its price would be high enough to stop the prospect who could use that type of super-transportation.

The Marbore II engines powering the M-S 760 are built in this country by Continental Aviation and Engineering Corp.

Performance Specifications

Top speed (at max. gross, 7480 lbs)	*405 mph*
Cruising speed & Range with climb and let-down allowance,, no Reserve):	
At sea level @ 350 mph	*530 mi*
at 10,000 ft @ 355 mph	*680 mi*
at 20,000 ft @ 350 mph	*875 mi*
Max. Range (at 23,000 ft at 20,000 rpm):	
at 294 mph (endurance: 3.3 hrs)	*970 mi*
Service ceiling (2 engines)	*34,400 ft*
Absolute ceiling (2 engines)	*36,000 ft*
Absolute ceiling (1 engine)	*9,000 ft*
T/O Dist. (at 105 mph)	*2500 ft*
Ground Roll	*2500 ft*
Dist. over 50 ft	*3550 ft*
Landing Distance	
Ground Roll	*1850 ft*
Total dist. over 50 ft	*3050 ft*
Rate of climb (2 engs @ 22,600 rpm):	
at sea level	*2260 fpm*
at 10,000 ft	*1600 fpm*
at 20,000 ft	*1000 fpm*
Rate of climb (1 eng)	
at sea level	*600 fpm*
Minimum stalling speed	*95 mph*
Weights:	
Empty weight with equip	*4325 lbs*
Oil and fuel	*2350 lbs*
Allowance for 4 & baggage	*805 lbs*
Total Gross	*7480 lbs*
Dimensions:	
Wing span	*33.3 ft*
Length	*32.9 ft*
Max height	*8.5 ft*
Cabin Pressurization:	
Pressure differential	*4.28 psi*
Alt @ 20,000 ft	*7800 ft*
Powerplant: Two Turbomeca Marbore 11	
Max power @ 22,600 rpm	*880 lbs*
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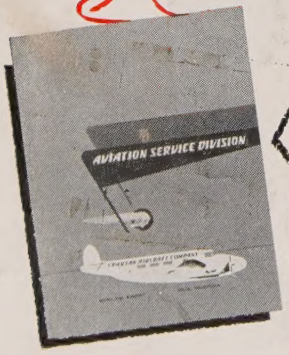

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